FLIGHT
and
AIRCRAFT ENGINEER

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# The Outlook

## "... and Tails You Lose"

ANYONE who had any hope that, during the passage of the Civil Aviation Bill through its committee stages, the position of the charter companies might be cleared up once and for all, must have been gravely disappointed. From time to time, in considering various clauses of the Bill, charter operations have been under discussion, and during the ninth day's proceedings, on June 20th, the subject was freely aired for nearly two and a half hours.

Strenuous efforts were made by Opposition members to obtain from the Parliamentary Secretary to the Ministry of Civil Aviation some clear and infallible definition of what constituted charter work, but it was all of no avail. The only thing that has emerged from Mr. Ivor Thomas's bantering and sometimes trite replies seems to be the fact that, until such time as the Government has seen its three corporations functioning and has been able to determine which way the charter cat will jump, it has no intention of making the charter operator's position clear "beyond all reasonable doubt."

The result of the efforts at clarification is not a very happy one. The charter operator is faced with a number of explanations of his position, many of them couched in contradictory terms, and his only consolation at this stage is the assurance of Mr. Ivor Thomas that that which the law does not forbid is permitted, and that, in fact, the Bill leaves a wide field open to private operators. It is, however, very difficult to reconcile this statement with another one made by the self-same Parliamentary Secretary, almost within the ambit of a breath, to the effect that he did not want to encourage anybody who was able to obtain an aircraft to enter into the charter field in the hope of making a great success of it.

When one bears in mind the heavy maximum penalties—a fine of £5,000, or two years' imprisonment—which can be exacted under this Bill for those who venture to start a service which can be described as "systematic," in violation of the monopoly held by the corporations, one feels that the eventual outlook for the charter operator is not very bright, and one is strongly tempted to agree with the remark of one Opposition member—that the Government does not, in fact, intend to allow any reasonably profitable amount of business to be undertaken by anybody but themselves. But, as we inferred in a complementary leader last week—"Heads I win . . .," it seems we must accept the fact that, since nationalization *is* nationalization, the State must win either way.

## Prices and Passports

ANY belief that the cost of long-distance air travel is excessive has been effectively countered by no less a person than the chairman of Cunard White Star. At the company's general meeting last week, he said that, when the *Queen Elizabeth* starts her trans-Atlantic crossings again in the autumn, the lowest minimum rate for the top class fare will be of the order of £90, or perhaps even more. If this is, in fact, to be the figure, then there is a very good chance that irrespective of the speed factor, it will be considerably cheaper to cross the Atlantic by air than, first-class, by sea, for the present single air fare of £93, as we mentioned last week, may well, if the recommendations of the North Atlantic Traffic Conference are accepted, be reduced to about £80.

This likely financial superiority of air travel, however, will not be assisted in the slightest by the useless nature of some of the red tape with which both the air-line operator and the passenger has to contend before the latter is allowed to leave this country for a foreign destination. We have constantly referred to the vital necessity of reducing to a minimum the complicated machinery of security, customs, immigration and the like. It was pleasing, therefore, to note that, last week, not only was a question asked once again in the House of Commons about the steps

being taken to abolish passports and their accompanying visas, but also that an outstanding point of the Cunard White Star chairman's speech was his statement that the whole system was an "intolerable clog on circulation as compared with the pre-1914 freedom."

With this we heartily agree, although it must be admitted that there are obvious difficulties in abolishing some of this red tape. As the Secretary of State for Foreign Affairs indicated in the House, the visa system had to be re-established for security reasons when war broke out, and this country cannot abolish passports and vias by unilateral action. However, we hope that Mr. Noel Baker's assurance—that His Majesty's Government is most anxious to eliminate unnecessary travel restrictions—will soon show some signs of justification.

CONTENTS


| | |
|---|---|
| Outlook | 1 |
| Farnborough Display | 3 |
| Here and There | 8 |
| High Altitude Research | 10 |
| Cierva "Air Horse" | 12 |
| Models in Britain | a |
| Cairo Cameo | 16 |
| Civil Aviation News | 19 |
| The Navarro Naiad | 22 |
| Fiddeń Engines | 23 |
| Correspondence | 24 |
| Service Aviation | 25 |


## At Farnborough

ONCE again some of the more aeronautically interested members of the British public have been given the opportunity of seeing something of what we are doing in this country and where we are going in the matter of aircraft and missile development. Once again, too, in a Government-sponsored display, all manner of items which, until the moment of the opening of this display, have been treated as secrets of the utmost importance, have been freely shown.

Just as politicians so often prefer that items of "hot" news should be held up to add interest to a particular speech, so, nowadays, there is a tendency for new developments, after being treated as being of a very secret nature, to be quite suddenly and almost casually mentioned, or even exhibited.

Surely it would be better, both for the general and the more directly interested public, if such new developments were given away a little less casually and in such a way that those whose duty it may be to inform this public might have a better chance of doing justice to them? Certainly, last week's Farnborough show, like that staged last autumn, was liable to give any technician a form of cerebral indigestion.

There was another lesson to be learnt at Farnborough. If any designer has retained a lingering suspicion that the tricycle undercarriage is merely a fashionable fad, he must have been convinced during the flying shows on at least two of the days, when the strong wind was blowing well off the runway. The difference between the easy way in which all the tricycled aircraft dealt with the difficult conditions, both on take-off and landing, and the appearance of battles with the elements which characterized the performances of the conventionally undercarriaged aircraft had to be seen to be believed. Not only could the tricycles be taken off without the need for too much differential throttle opening—a necessary corrective action which considerably extends the take-off run—but they could be put down normally in the knowledge that, once down, they would run straight, almost irrespective of wind direction.

Since, for some time to come, airfields are likely to be short of possible runway directions, dynamic directional stability may make all the difference to ground safety standards and certainly to ease of mind amongst the pilots.

*"Flight" photograph.*

**RICH FARE: On four successive days the Royal Aircraft Establishment, Farnborough, was the rendezvous of the most advanced types of military and civil aircraft as depicted above and related in this issue. The flying display was rivalled in interest by a static exhibition of exceptional importance.**

Ultra modernity characterized the static exhibition. The Vickers transonic rocket is in the foreground.

# Farnborough Display

## *Four-day Show of British Aeronautical Achievement at the Royal Aircraft Establishment*

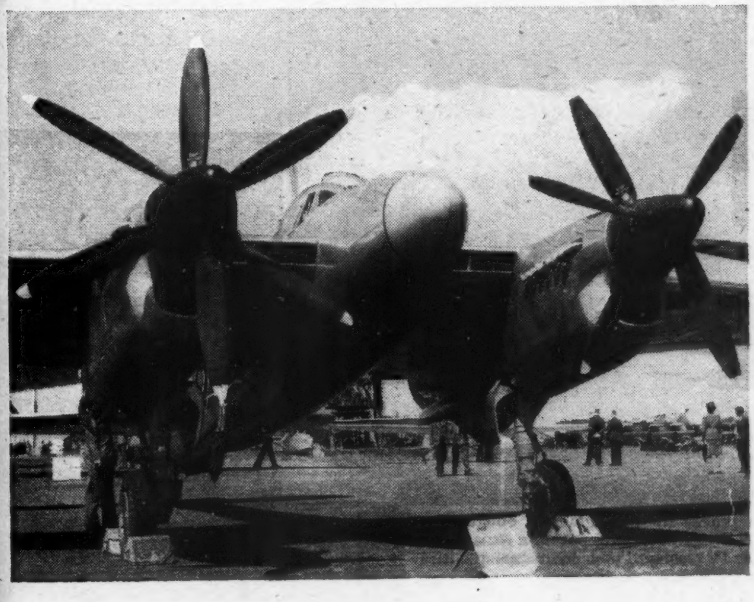
*Illustrated by "Flight" photographs and Sketches.*

IT does not, perhaps, very much matter who was responsible for the idea of holding last week's magnificent four-day event at Farnborough—suffice to say that, no matter who it was, he deserves the unstinted praise of everyone who attended.

The event was held on June 27th to 30th inclusive, the final day, Sunday, being for the general public. We made Friday our principal day of attendance and the weather could not have been better. Great masses of cumulus cloud gave scale to the aircraft flying in the display as well as providing sport for the really quick machines in showing off their aerobatic qualities. However, spectacular and interesting though it was, the flying side of the exhibition did not form the primary part of the display. The real purpose of the show was to reveal the products and quality of our aviation industry, and to demonstrate in some measure the resources of the R.A.E.

As in previous Farnborough shows, 'A' shed was used as the main exhibition hall, most of the engine, aircraft, and accessory manufacturers having stands. A good deal of typical R.A.E. work was also included in the main hall although, naturally, certain exhibits such as the full-size structural testing frames, high-speed wind tunnel and the ditching tank could not have been seen anywhere but *in situ*.

Taking the engines first, Rolls-Royce, Bristol, de Havilland and Napier all displayed part-sectioned working models of various of their products, the finish and general quality of which easily upheld the extremely high standard we have grown naturally to expect of them. Rolls-Royce exhibited a Trent gas-turbine complete with a small five-



Of exceptionally compact design the new Short Sturgeon deck-landing reconnaissance aircraft is a three-seater carrying a battery of three cameras. The contra-props shown here are driven by R.-R. Merlins.

## FARNBOROUGH DISPLAY

bladed Rotol airscrew such as experimentally installed in a Meteor II, and, in addition, showed a Merlin, Griffon, Derwent V and a Nene.

Bristol had a sectioned Centaurus, and a Hercules 230, the 2,020 b.h.p. output of which is scheduled to go up to 2,500 b.h.p. as soon as better fuels become available. This engine is also bespoke for the military version of the Viking. A new departure in radial engine practice was shown in a vertically-finned cylinder and a new four-piece crankshaft affording greater centre bearing capacity. The airscrew/gas turbine Theseus was on show, complete and broken-down into main components, together with a sectioned drawing which illustrated the internal arrangement and flow paths through the unit.

### Mock-ups and Models

On the de Havilland stand was a Goblin, and a Gipsy Major 10 fitted with a small manually operated variable-pitch airscrew. Armstrong-Siddeleys displayed a Python gas-turbine designed for an eight-bladed contra-rotating airscrew, and, in contrast, a sectioned, working model of the famous Cheetah which has done such yeoman service on Ansons and Oxfords.

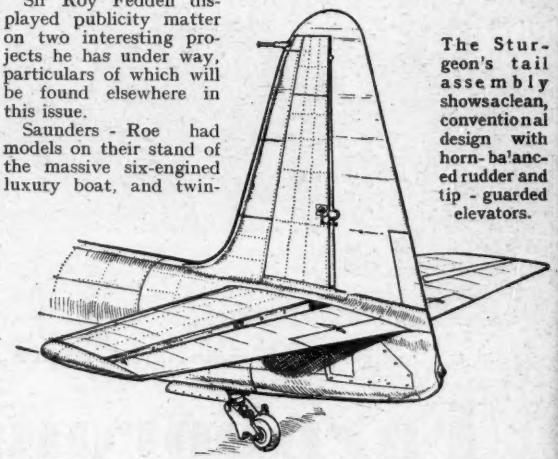
Alvis had their new Leonides 500 b.h.p. nine-cylinder radial, which is specially designed for installation as a complete power plant and has an installed specific weight of 2.23 lb/b.h.p. Blackburn displayed Cirrus Minor and Major series engines such as are employed on the Autocrat, Gemini, Messenger, and Aerovan.

An excellent exhibit of Metropolitan-Vickers showed one of their F2 Series IV axial-flow gas-turbines installed in a mock-up wing section covered in Perspex; the section used was 20ft chord with a t/c ratio of 18 per cent, and it showed very well indeed the simplicity of such an arrangement and, in addition, emphasized the great advantage enjoyed by axial-flow type units for submerged installations. The F3 gas-turbine with ducted-fan thrust-augmentor (*Flight*, April 25th, 1946) was also included on the stand.

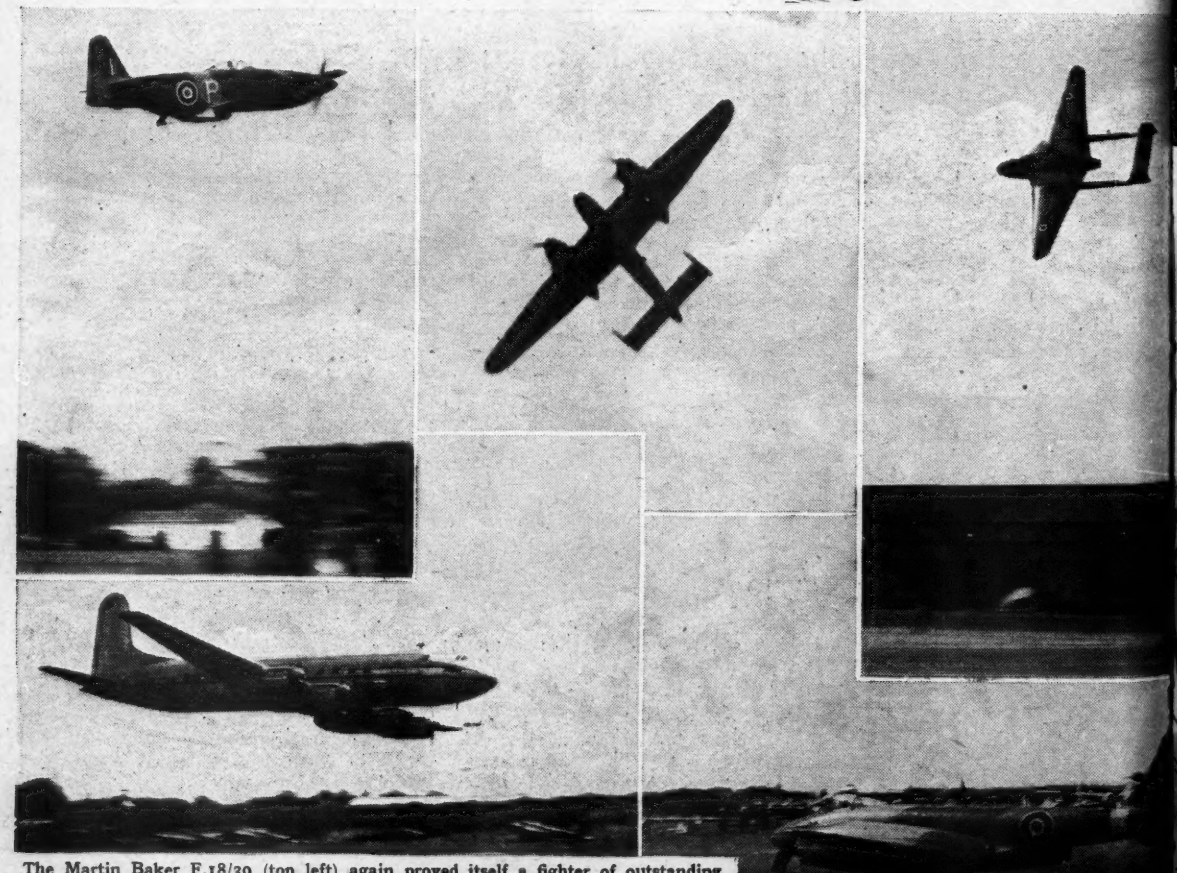
Napiers were represented by a working, sectioned Sabre complemented by a beautifully neat Firebrand power plant of but 12.8 sq ft frontal area. The Sabre VII was the first modern British piston engine to develop over 3,000 b.h.p. and its specific weight of 0.83 lb/b.h.p. and specific power of 83 b.h.p./litre have still not been improved upon.

Sir Roy Fedden displayed publicity matter on two interesting projects he has under way, particulars of which will be found elsewhere in this issue.

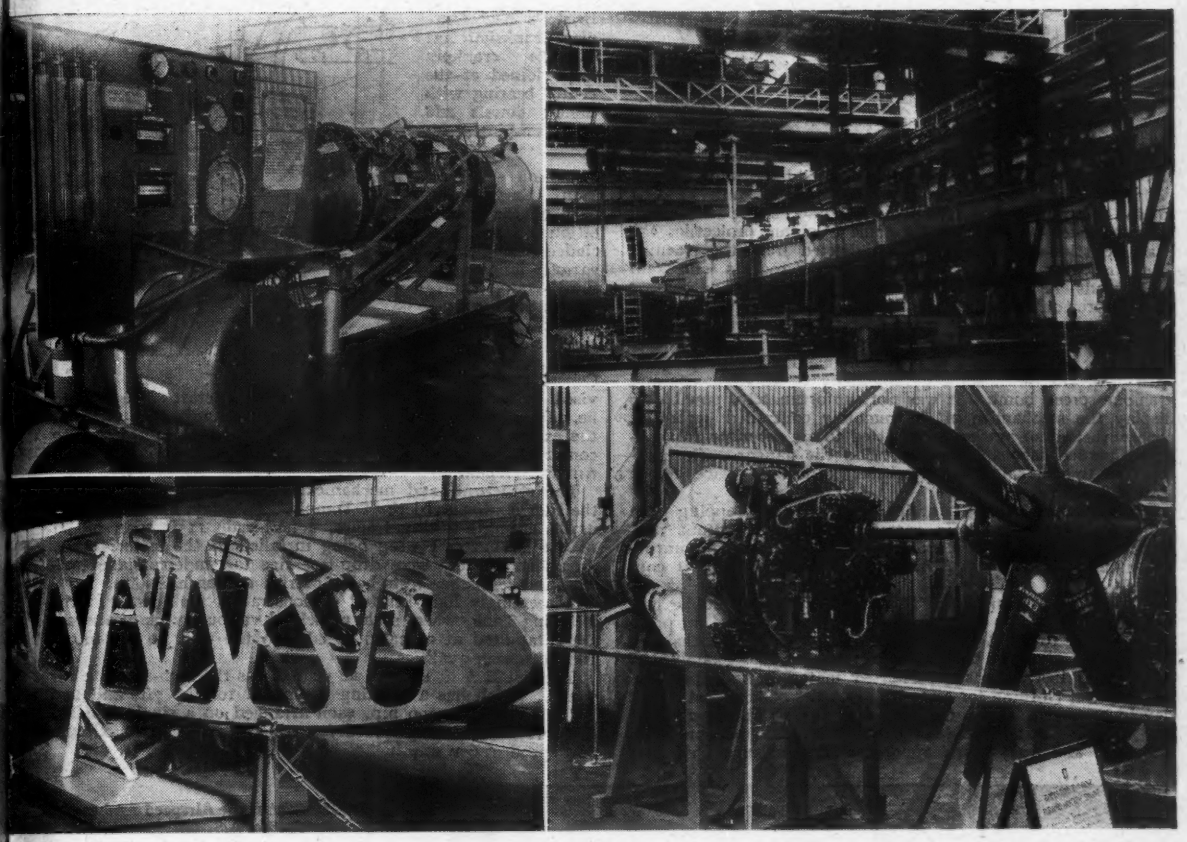
Saunders-Roe had models on their stand of the massive six-engined luxury boat, and twin-



**The Sturgeon's tail assembly shows a clean, conventional design with horn-balanced rudder and tip-guarded elevators.**

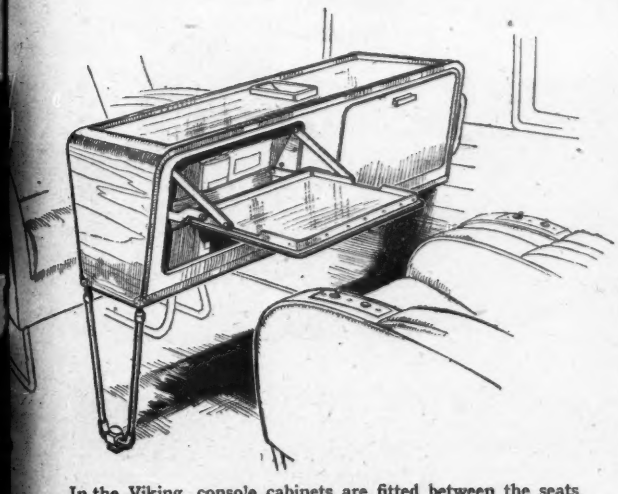


**The Martin Baker F.18/39 (top left) again proved itself a fighter of outstanding merit. Despite its size and weight the Bristol Brigand (centre) put up a remarkable show, while the Vampire, Tudor II and Meteor IV displayed their individual qualities in their usual style.**



**A Junkers Jumo 004 was shown in place on the mobile turbine-jet test stand (top left). Top right is a Brabazon I half-scale wing in the "Cathedral" test frame. Below are a mock-up of a buried Metro-Vick jet installation and (right) the Rolls-Royce Trent airscrew-turbine unit.**

jet single-seat fighter flying boat which are at present engaging their attention. The latter is a particularly interesting project designed for two Metro-Vick axial-flow units housed in the hull beneath the wing roots. Among the other aircraft manufacturers' exhibits, the military transport development of the Airspeed Ambassador was an extremely attractive-looking machine, with very cleverly arranged loading doors in the central portion of the rear fuselage.



**In the Viking, console cabinets are fitted between the seats and incorporate folding tables and cubby-holes for personal effects.**

Handley-Page had a full-size mock-up fuselage of the Hermes which was completely furnished and gave to the weary spectator an excuse to rest awhile on the pretext of sampling the chair comfort, whilst Miles had on their stand a galaxy of models ranging from the old Hawk through the Libellulas to the three-quarters completed M.52 experimental transonic research projectile to specification E24/43. A model showed it to have square-cut wings with no sweep-back, the design having been prepared before the results of German research became available, and an annular intake (to a special Power Jets gas-turbine) surrounding a nose cone housing the pilot. This cone, complete with pilot, can be ejected in emergency and be landed by parachute.

In general arrangement the M.52, which has a span of about 26ft, resembles the Vickers rocket-propelled transonic model. A speed of 1,000 m.p.h. was mentioned.

## Sonic Flight Research

The Vickers transonic research rocket is expected to yield useful data on this troublesome region of flight speed within the near future. It is powered by a bi-fuel rocket on the Walter principle employing C- and T-Stoff; 7½ gallons of C-Stoff is contained in a nose tank, whilst a central four-gallon tank and a tail eight-gallon tank contain T-Stoff. Pitot and static heads project well in front of the nose, and their readings, together with readings of elevator angle, are telemetered to the ground whilst the rocket's flight is tracked by radar. The device is dropped from a Mosquito at 36,000ft. It glides a short distance and then levels out: the fuel is ignited and sonic speed reached in 16 seconds with a maximum speed of Mach 1.3 in 70 seconds. Fuel is expended at this point, the elevator automatically locked down, and the rocket thus dives into the sea.

The armament display was unique in that offensive weapons from a Lewis gun to rocket missiles—even a model of beam-

## FARNBOROUGH DISPLAY

riding air-to-air guided missile—were available for demonstration. By way of the 0.303in gas-operated Vickers and Browning, a half-inch Colt and 20 mm Mark I and V Hispanos, the guns ranged to the 40 mm Vickers "S" gun (rate of fire 110 r.p.m.) and the experimental Rolls-Royce of the same calibre.

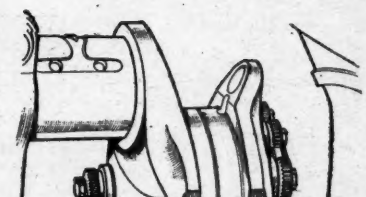
On the tarmac nearby stood a Mosquito FB Mark VI used for the determination of R/P ballistics, and having zero-length carriers under the fuselage for some awesome projectiles the characteristics of which had been deleted from the placard. The port wing was decked with four 3in rockets with 25lb A.P. heads, and the starboard wing with the same number of 60lb projectiles having S.A.P.H.E. heads.

### Lancaster Barbette Guns

Hangar exhibits included a formidable Bristol B.17 turret with twin Hispanos, some gyro gun-sights, carrier units and a smoke screen bomb. It was not, unfortunately, possible to display the mechanism of the remotely controlled barbettes, each with two 20 mm guns, as fitted to an experimental Lancaster parked inconspicuously behind the hangar. The gun-layer in this machine has a special position in place of the standard tail turret.

The capacious supply container designed for dropping from Halifaxes and Lancasters seemed to many visitors misclassified as an armament exhibit—until they fell to counting the number of boxes of S.A.A. and other munitions it contained.

Other R.A.E. exhibits in "A" shed included a mobile gas-turbine test stand on which a Jumo 004 was mounted for proof testing prior to flight trials; a mobile decompression chamber for training pilots in the use of oxygen; various examples of operational instruments; specialized materials and their use in the latest clothing for aircrew; examples of the most recent developments in aerial cameras and the mobile equipment for "rush" printing; demonstration models of controlled weapons; and a Schlieren apparatus for rendering fluid flow formation visible.



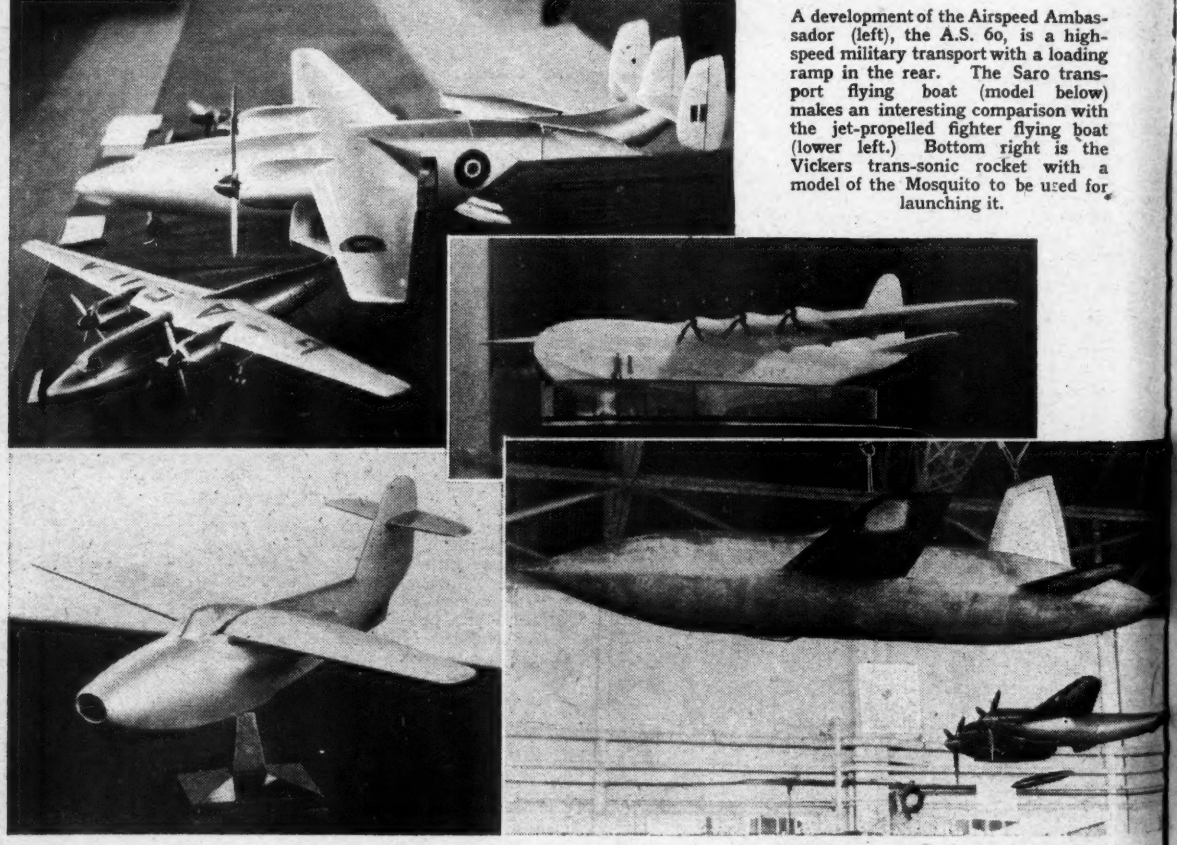
Bristol's new four-piece crankshaft has separate crankpin units joined at the centre bearing with hollow dowels and set-pins.

In the radio part of the exhibition were included examples of various long- and short-range communication equipment, including the latest intercomm. sets. The Consol system devised by the Germans was of particular interest since it is to be officially adopted for our own civil aircraft use, utilizing the existing German-built station at Stavanger in Norway to complement a new station now being built at Bush Mills, Antrim, Ireland.

The structural and mechanical engineering department of the R.A.E. displayed the "Temple," "Abbey," and "Cathedral" strength-testing frames, a half-scale 115ft span model of the Brabazon I wing being installed in the latter frame. In addition there were drop-test rigs for undercarriage testing, and resonance tests being carried out on a Seafire.

A seemingly light-hearted demonstration took place in the Ditching Tank, where scale models of various types of aircraft are catapulted at a scaled speed into the tank to determine their ditching qualities.

The last R.A.E. exhibit we visited was the high-speed wind-tunnel, which has a working section of 10ft by 7ft, and two D.C. motors of 2,000 h.p. each arranged on a single shaft to drive the 16ft dia 13-bladed fan which produces a maximum flow speed of 600 m.p.h.



A development of the Airspeed Ambassador (left), the A.S. 60, is a high-speed military transport with a loading ramp in the rear. The Saro transport flying boat (model below) makes an interesting comparison with the jet-propelled fighter flying boat (lower left.) Bottom right is the Vickers trans-sonic rocket with a model of the Mosquito to be used for launching it.

**A Seafire III perched high on a "P" catapult of the type mounted during the war on merchant ships. Nearby was the C.I. cordite-operated accelerator from which a Seafire was launched at 3½g.**

Outside in the sunshine a concourse of aircraft, military and civil, stood on the tarmac —some in drab camouflage, same in polished camouflage, some brightly painted and—best of all—some highly polished, gleaming and glittering in all the pristine glory of uncovered metal. Newest of all of them was the Short Sturgeon, a twin-Merlined, contra-propped, three-seat Naval reconnaissance machine intended for operation both from airfield and carried decks. It is a largish aircraft and its weight is probably in the 25,000lb class, but nevertheless, the quoted speed of "over 300 m.p.h." would seem to be maskingly conservative.

## SATURDAY'S FLYING

OBVIOUSLY, with three or even four days of flying on which to remark, it would be impossible to do justice to a series of displays which were undoubtedly the best and most representative since pre-war years. Indeed, a simple running commentary covering the successive moments and manœuvres of any particular day would make dull and even pointless reading.

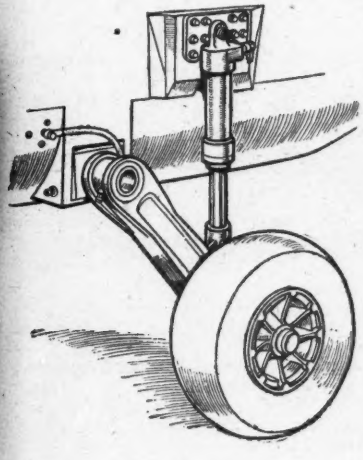
But for the visitors there were probably half a dozen types which, to the majority, would be new, and on Saturday, with a boisterous wind blowing some thirty or forty degrees off the long Farnborough runway, interest was increased, for those knowledgeable in such matters, by a study of individual cross-wind technique and aircraft handling qualities during both the take-off and the landings. The situation was, to say the least of it, packed with interest for any designer who might still doubt the overall advantages, particularly in such conditions, of the tricycle undercarriage. By sheer piloting skill and experience, and by virtue of the products of the tyre and brake manufacturers, there were no ground loops, but there were certainly some very hectic moments, as some of the bigger and heavier aircraft with lots of keel surface did their very best to weathercock. Quite a lot of money must have gone up in rubber smoke during the afternoon.

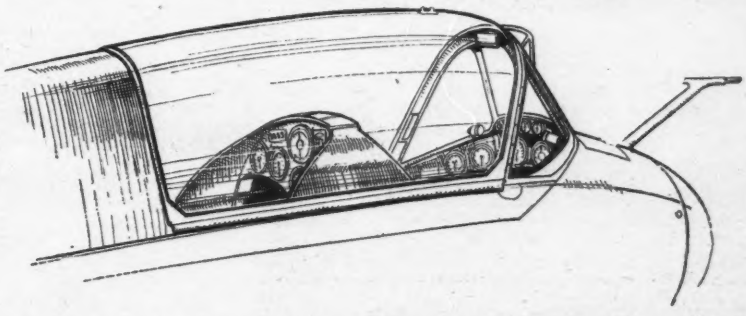
From the point of view of the habitué of such flying displays the most interesting events were probably the catapulting of a Seafire more or less over the heads of the crowd; the extraordinary demonstration of slow-flying control by the Martin Baker fighter; the slow fly-past of the B.O.A.C. Short Hythe boat; the demonstration of the Handley Page Hastings/Hermes with its two starboard airscrews feathered; the rocket-assisted take-off by a Griffon Seafire; and the extraordinary way in which the Meteor IV, in one of its near vertical climbs, actually burnt a couple of neat holes in a shallow cloud.

Each of the assisted take-off demonstrations took the crowd more or less by surprise. That from the catapult resulted in an aircraft appearing quite miraculously airborne, with the undercarriage up, from a totally impossible direction. The rocketed Seafire taxied quietly down the runway to a line of flags, when the pilot started to open up before firing his rockets; there was a not inconsiderable explosion of brief duration, and the Seafire was airborne with the undercarriage tucking itself up in a matter of three seconds or so. The Martin-Baker was swung from bank to vertical bank at a speed which, allowing for 40 m.h.p. or so of mid-upper wind, cannot have been much above its stall; previously it had been flying in a series of stalled falling-leaf manœuvres.

On the very professional display as a whole it would be difficult to comment satisfactorily in a few words. Each aircraft, according to its limitations or otherwise, was shown to the best advantage, but for sheer aerobatic virtuosity the Sea Fury might have taken any prize going.

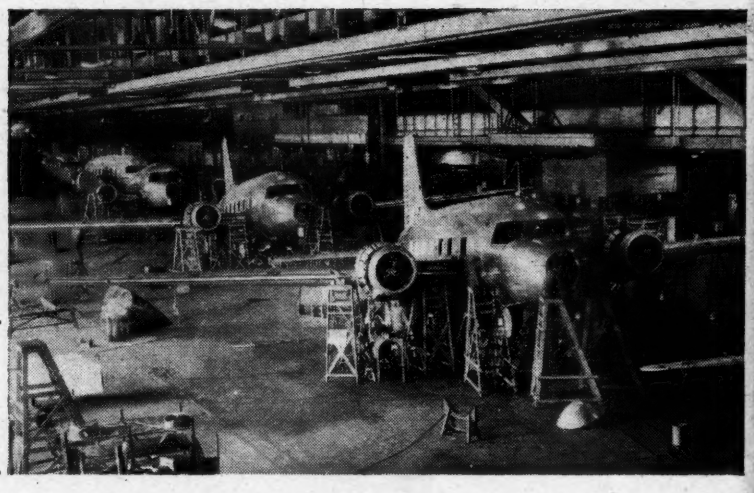
The following aircraft were flown on one or all of the days of the display: Avro Tudor II (Thorne); ;Avro York (Capt. Griffith); Handley Page Hastings (Sqn. Ldr. Hartford); Miles Marathon (Waller); Bristol Freighter (Pegg); Vickers Viking (Lowdell); D.H. Dove (Fossett); Short Seaford (Sqn. Ldr. Squire); Hythe (Capt. Stone); Seafire XVII (Lt. Cdr. Brown); D.H. Hornet (Pike); Bristol Brigand (Gibbs); Fairey Firefly (Twiss); Hawker Sea Fury (Humble); Supermarine Seafang (Quill); Seafire III (Lt. Cdr. Brown); Hawker Fury I (Muspratt); Gloster Meteor (W/Cdr. Beamont); D.H. Vampire (de Havilland); Martin Baker (Sqn. Ldr. Zurakowski); Blackburn Firebrand (Richmond); Percival Prentice (Carruthers); Proctor V (Saunderson); Auster Autocrat (Snarey); Miles Gemini (George Miles); and Aerovan (Kendall). Incidentally, there were a number of very odd figures and facts in the official brochure, which might have been more carefully checked.





**(Left) A trailing main leg with radius arm shock-absorber is used on the Aerovan undercarriage. (Above) The Reid & Sigrist Desford trainer has a beautifully formed blown canopy, and the pitot head acts as a horizon datum for pupil pilots.**

# HERE AND THERE



**A LINE FOR AIRLINES: Vikings taking shape at Vickers' Weybridge factory. In this erection shop hundreds of Wellingtons were produced during the war.**

## "Flight Supervisor" Wanted

THE College of Aeronautics, Cranfield, Nr. Bletchley, has recently been asking for the services of an experienced test pilot to organize and maintain their Flight Section. The requirements are that he should be a good pilot with practical experience of modern types and with a thorough knowledge of the use of modern instrumental aids with, preferably, experience of long-distance flying. The object of this Flight Section is to give students of the college a comprehensive knowledge of test flying and practical research work.

## York versus York

THREE Tudor IIs and three Yorks have been ordered from Avro's by the South American airline, *Flota Aerea Mercante*, of Argentina—a useful bit of export business to the tune of some £500,000.

As they are to operate over the same route—London, Lisbon, Bathurst, Natal, Buenos Aires—as British South American Airways, who are also being supplied with the same type of 21-seater York, there should be some of that healthy competition advocated by private enterprise.

The Argentine concern is to get delivery of its Yorks within the next two months.

## Quo Vadis?

A NON-PROFITMAKING corporation, to be known as Air Affairs Inc. has been formed by some 40 companies and more than 100 individuals in order to "study and predict the social effects of aviation."

A prominent member of the new organization is Mr. William L. Clayton, the U.S. Assistant Secretary of State.

## Parliamentary Plea

A PETITION has been presented to the House of Commons by Major Niall MacPherson on behalf of the Aeronautical Engineers' Association, asking that recognition be accorded to the Association as a Trade Union, and also that the Association may be permitted to elect representative members to serve on the Whitley council. The petition has been presented because it is alleged that the Air Ministry has declined to admit members of the Association to local Whitley councils and has varied the terms, in relation to discharge, under which the petitioners were engaged.

## S.B.A.C.'s New President

MR. W. R. VERDON SMITH, a director of the Bristol Aeroplane Co., and son of its chairman, Sir W. G. Verdon Smith, has been elected president of the S.B.A.C. for 1946-47. Mr. Robert Blackburn, chairman and managing director of Blackburn Aircraft, Ltd., has been re-elected vice-president, and Mr. Arthur Gouge (Saunders-Roe, Ltd.), becomes deputy-president.

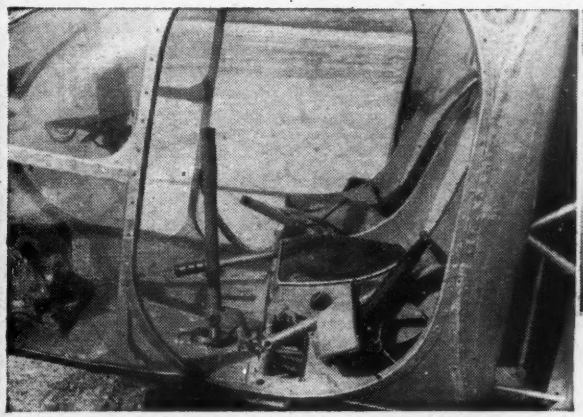
### TRANS-OCEAN TRAVEL

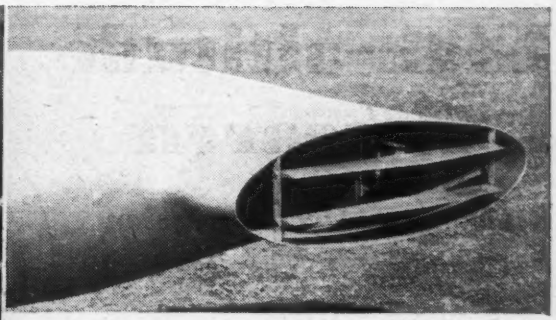
*PRIOR to their first scheduled transatlantic service which began last Monday, July 1st, B.O.A.C. made a number of proving flights with their Lockheed Constellations, of which all five have been delivered. On Monday, June 24th, "Flight's" Assistant Editor was a passenger on one of the final proving flights and the return trip was made during June 30th/July 1st on a positioning-flight. Impressions of travel by trans-oceanic airlines and notes on the airports visited, and their organization and facilities will appear in future issues of "Flight," starting next week.*

## The XB-35 Flies

THE Northrop flying wing bomber, designated the XB-35, which was described in *Flight* of May 9th, made its first test flight on June 25th, at Hawthorne, California. There cannot have been anything very much the matter with the prototype, since it was, according to reports, in the air for more than forty minutes. It is by way of being

**HUNDRED-TONNER: The designed gross weight of the Consolidated-Vultee XB-36 is well over 100 tons. Should this figure fail to convey the awesomeness of this largest of bombers, soon to be test-flown, the reader is offered the following data: span, 230ft; length, 163ft; fuselage diameter, 12ft 6in; height of rudder tip from ground, 46ft; weight of each tyre, 1,500 lb. Six Pratt and Whitney Wasp Majors supply 18,000 h.p. A civil transport, the CV-37, is being developed along similar lines. This will weigh over 140 tons, carry 204 passengers, and cruise at over 300 m.p.h.**





"Flight" photograph.

**FROM BOTH ENDS: The cockpit and tail control orifice of the Cierva W9 helicopter, which first appeared in public at Southampton on Saturday, June 22nd. The photograph of the cockpit shows the extreme simplicity of the controls.**

## HERE AND THERE

quite a large aircraft for such a comparatively unusual design, since the overload gross weight is expected finally to be in the region of 210,000 lb. Fifteen XB-35s have been ordered by the U.S. Army Air Corps.

### Office Removal by Air

THE whole of the office equipment of the European and Central Inland Transport organization of Cooks was flown over to its new quarters in Paris recently. While the office personnel, consisting of some 150 people, travelled by train and boat, the equipment was taken over by Air France in three separate trips, using Junkers Ju. 52s. The whole job was completed within twenty-four hours.

### Another "Flight" Decoration

AMONGST the names appearing in the Birthday Honours List is that of Sqn. Ldr. H. F. King, R.A.F.V.R., who has been made a Member of the Most Excellent Order of the British Empire for his work at the Air Ministry on technical intelligence. Sqn. Ldr. King, M.B.E., who joined the staff of *Flight* in 1930, made a special study of military and foreign aircraft in pre-war years, and the information he collected must have been of immense value in his work at the Air Ministry, where he specialized in enemy aircraft and power plant design, with particular reference to turbine-jet and rocket aircraft and "secret" weapons. His duties carried him to Italy, North Africa and Egypt. Sqn. Ldr. King returned to the editorial staff of *Flight* early this year.

**An impression by Wren of Sqn. Ldr. H. F. King.**

### Ballooning Again?

AN international balloon conference, held at Interlaken, Switzerland, recently, was attended by representatives of seven nations. The British delegation consisted of Mr. S. Kenneth Davies, vice-chairman of the R.Ae.C., Lord Ventry, and Wing Cdr. Booth, who, it may be remembered, commanded the R.100.

At the conference it was decided to revive and encourage the sport of free ballooning and to ask the F.A.I. to include lighter-than-air operations under one of its special commissions. The provisions of the "Aeronaut's Certificate" were overhauled, and an international organization was set up, with headquarters in Paris. The delegates were the guests of the Swiss Aero Club.

### Radio Diagnosis

THE Senior Medical Officer of a Sunderland flying-boat squadron stationed at Seletar, Singapore, recently had the somewhat difficult job of diagnosing the illness of a member of the crew of a U.S. merchant ship. An urgent call had been received by the R.A.F., through Naval Headquarters, from the ship in question, a tanker, asking for an aircraft to bring medical aid. At the time the tanker was some 300 miles from Singapore and, had weather conditions permitted, it was intended to put the aircraft down beside the ship and to transfer the patient. Unfortunately, after some three hours' flying, it was decided that such a landing would be too hazardous, and ultimately the boat circled over the tanker for more than an hour while the medical officer, Sqn. Ldr. G. M. Carstairs, listened to the skipper's account of the symptoms and finally made a diagnosis and gave directions for treatment.

### Aiding R.A.F. Families

LAST year 25,591 cases received the help of the R.A.F. Benevolent Fund, while grants amounted to £325,223—an increase of £162,610 on the figure for 1944. Education absorbed £13,277, school fees for 547 children being paid. These facts are given in the Twenty-Sixth Annual Report of the Royal Air Force Benevolent Fund.

The report discloses that a special branch of the Fund has been set up to assist disabled R.A.F. personnel, and, in particular, badly injured aircrews. Such are aided from hospital days to rehabilitation and resettlement.

## News in Brief

Flt. Lt. G. N. Snarey, A.F.C., has been appointed chief test pilot of Auster Aircraft. Prior to the war Flt. Lt. Snarey was assistant chief test pilot at Westland Aircraft and was later engaged in production flying for Vickers Supermarine.

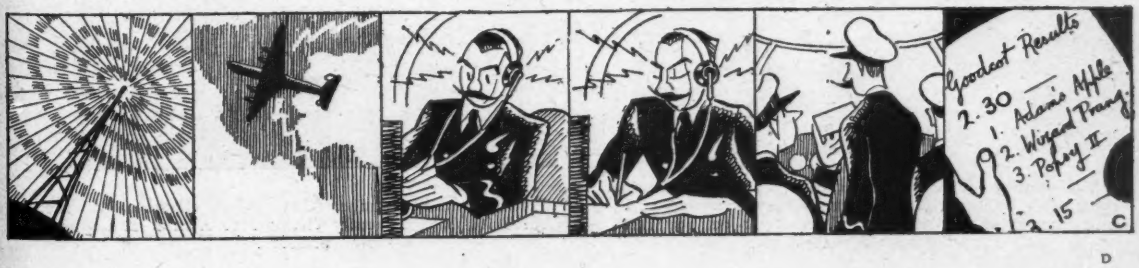
* * *

Although he will continue to act in an advisory capacity, Mr. L. E. Metcalfe has, at his own request, relinquished his position as managing director of Warwick Aviation, of Saltisford, Warwick. Mr. H. Perry has been elected to fill the vacancy on the board.

* * *

Aircraft & Allied Enterprises, Ltd., of 10, Hobart Place, Eaton Square, London, S.W.1, have now concluded an agreement with the Czech manufacturers of the Mraz Sokol whereby they will handle the distribution of these machines over the whole of the British Empire and Dominions. Some details and flying impressions of the Sokol were given in the issue of June 20th.

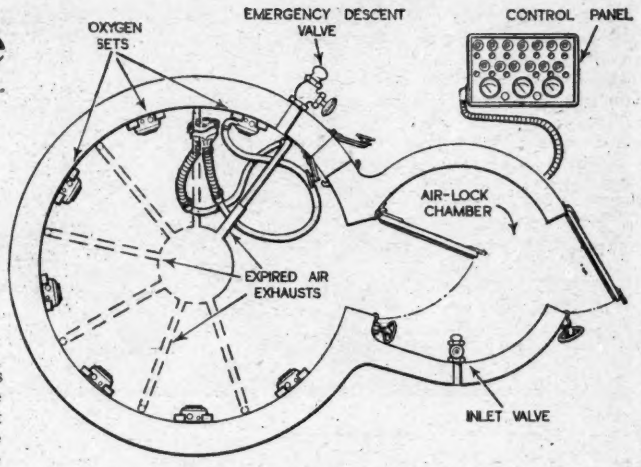
## AIRSTRIP . . . No. 21




D

# High-altitude Research

## *German Decompression Chambers : The Medical Aspect*




**Diagrammatic plan of chamber, showing air-lock chamber, valves, disposition of oxygen sets and mask exhaust pipes.**

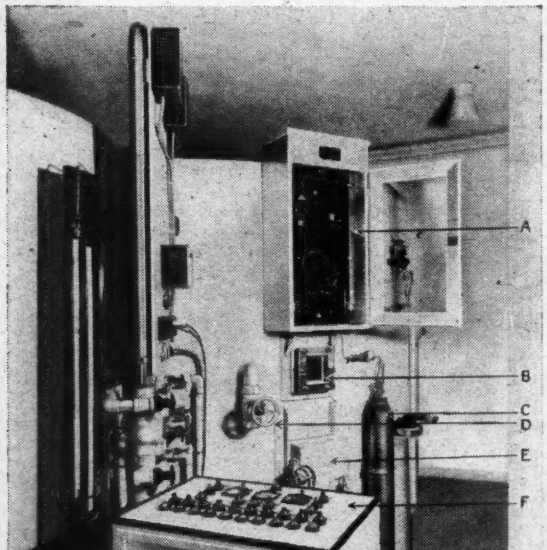
SINCE high-altitude flight for normal work has been rendered a practical possibility by the advent of successful pressurization of cabins, it is not without interest to examine one aspect of the general high-flying problem as approached by the Germans during the war. Similarly with our own case, there would seem to be little likelihood that the initial German efforts were undertaken with anything but a military end in view, but they seem to have devoted a good deal of attention to the physiological aspects of decompression, and particularly to sudden decompression such as would occur if a pressure cabin were pierced by a large-calibre or explosive shell.

They studied the latter aspects of the problem by adapting ordinary decompression chambers with a special device whereby a very great reduction in pressure could be obtained virtually instantaneously—they called it explosive decompression—and by so doing simulate the required effects.

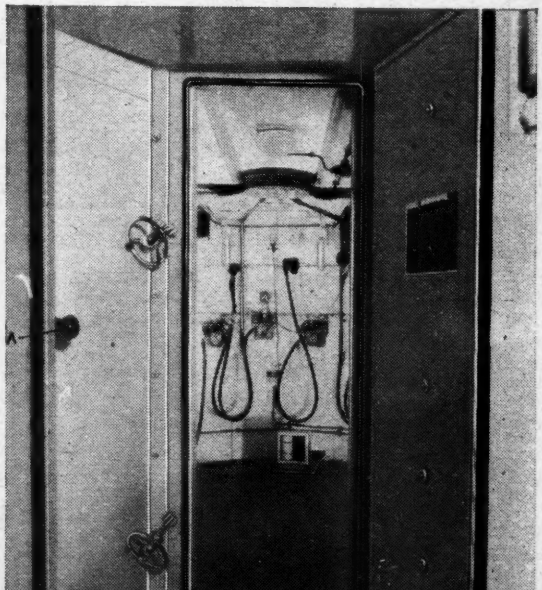
The standard decompression chambers used by the Luftwaffe were all manufactured by the Zeuzen Company of Frankfurt, who have been making low-pressure chambers since 1928: but, at first, only small therapeutic chambers 5ft diameter by 6ft 6in high were built, these being used by hospitals and private doctors for the treatment of asthma and other respiratory diseases.

When the project of explosive decompression was started, however, all the mobile chambers were converted to have the extra feature incorporated. These modified chambers were called *Struzkammers*, and it is worthy of note that they were insulated by a new material "Iparkan" made by the I.G. Farbenindustrie and derived from formaldehyde, possessing a density of 0.13 as compared with that of cork, which is 0.30.

A huge decompression chamber 105ft long by 24ft diameter was recently discovered in Berlin. Construction




**Control station outside chamber. A, room conditioning apparatus ; B, inspection window ; C, oxygen cylinder ; D, emergency rapid-descent valve : E, small air-lock for introducing small items : F, main control panel.**

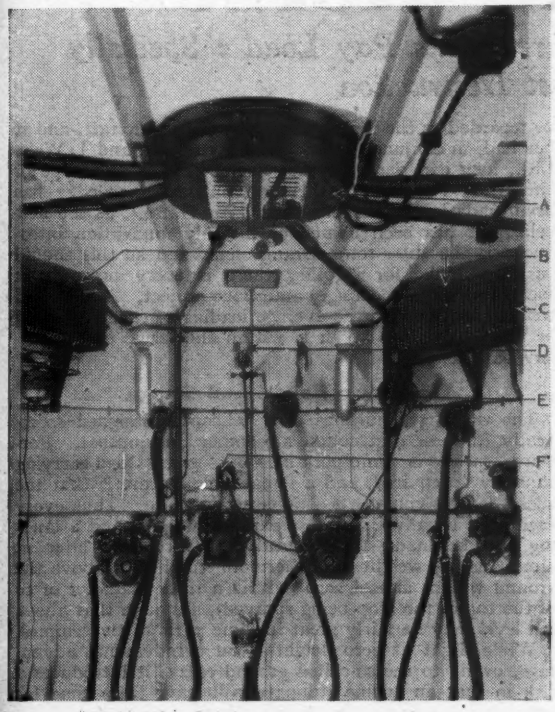



**View into main chamber from air-lock chamber. A, inlet valve for bringing entry chamber to normal atmospheric pressure.**

of the chamber was not completed, but provision had been made to sub-divide it into three large compartments with separate air-locks giving access to each. The whole chamber was mounted on springs, and it is thought to have been constructed to enable experiments to be carried out on human beings subjected to differing atmospheric pressures for long intervals of time.

In the accompanying photographs is illustrated a special chamber discovered at the Brunswick Luftwaffe Medical Centre. The maker's label on the front states that it is a "special decompression chamber for air travel research," and it is undoubtedly a very well-appointed piece of technical apparatus.

Control is effected electrically from outside by means of a well-designed instrument panel incorporating push-button controls, each with a red warning light. The main chamber itself is a vertical cylinder, and is entered

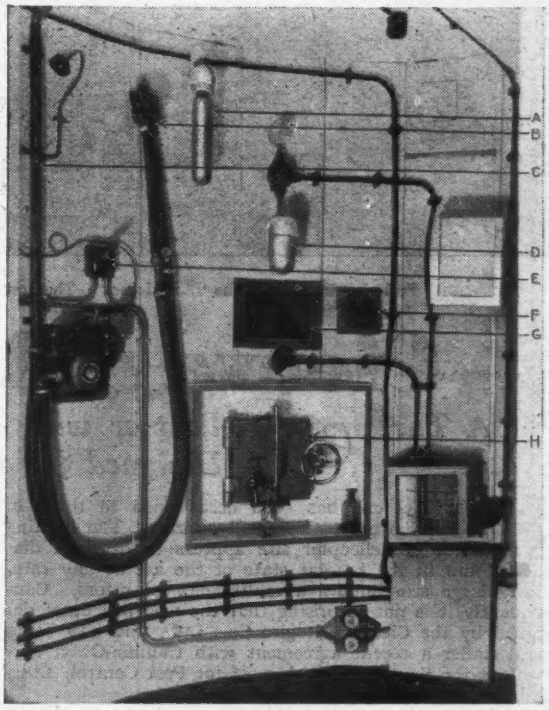



Main chamber interior. A, central duct into which expired oxygen is exhausted; B, C, refrigeration apparatus; D, ultra-violet mercury vapour bulb: E, long-wave radiant-heat bulb ; F, inter-comm. socket.

through a smaller cylindrical chamber, the entrance from outside being guarded by an air-tight door, whilst access between the chambers is by means of another air-tight door. It is, therefore, possible to enter the main chamber through an air-lock, and there seems no doubt that, in addition, this installation could be used to conduct experiments on explosive decompression.

The chamber accommodates eight people and is equipped with modern type German oxygen apparatus, laryngoscope intercommunication and ordinary telephones. Expired air from the oxygen masks is led by tubes to a central duct in the roof whence it is exhausted, possibly to be treated by soda-lime, though it was not possible to confirm this latter point.

Oxygen is supplied from external cylinders to a manifold pipe from which branches serve the economizer sets for each mask outfit. The interior is equipped with ultra-violet (short-wave) and radiant heat (long-wave) emission bulbs, as well as refrigeration apparatus and electric fans, all being operated from the external push-button control




Main chamber interior. A, radiant-heat bulb ; B, oxygen face mask ; C, expired air pipe to central duct ; D, normal lighting bulb ; E, inter-comm. socket : F, fresh air inlet ; G, inspection window ; H, small article introduction air-lock.

panel. The panel gauges read up to an altitude of 46,000ft and the rate of ascent or descent up to 650ft/sec.

Beneath the chamber is a cellar in which is housed the operating machinery, access between cellar and chamber being by means of a steel ladder and a trapdoor.

## FLYING AS IT IS TO-DAY.

WITH all the acknowledgment necessary we are unable to resist the temptation to reprint part of a delightful piece which appeared in the June issue of *The Log*—the journal of the British Air Line Pilots' Association. It represents a set of most carefully compiled questions and answers designed for the benefit of embryonic airline pilots appearing before a selection board. It would need very much more than a two-page article to explain the present European flying conditions with equal clarity and conciseness.

Q. "What system of Radio Control and Navigation is in use in Europe?"

A. "DF, HFDF, VHF, VBF, SBA, Gee, Gee Whiz, Rebecca, Eureka, Pop-eye, Babs and Home-on-the-range."

Q. "Good. Who controls it?"

A. "RAFTC, USATC MAFF LAFF WAFF UXBRIDGE UMBRIDGE and P.O. Prune."

Q. "Who used to do it before the war?"

A. "Jimmy Jeffs."

Q. "Well, what actually happens now?"

A. "No see, no fly."

Q. "What is Croydon?"

A. "A built-up area completely surrounded by Dakotas."

Q. "How do you get in?"

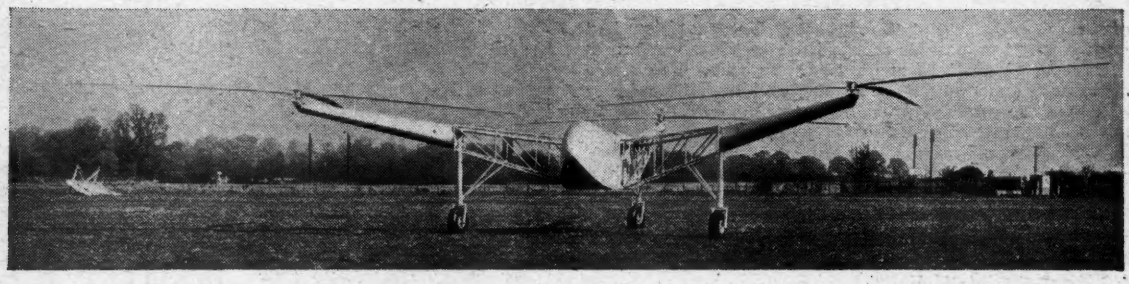
A. "Just like Grandpa used to do. Follow the Southern Railway until it goes into a tunnel, over the chalkpits, Yoho for the Purley Way, turn left at the Greyhound, look out for the gasworks, sideslip over the Aerodrome Hotel—run into Air France taxying out, go round again and 'ave another go."

Q. "What is Isobar flying?"

A. "Avoiding a depression with a chosen instrument."

Q. "What famous British transports have blazed the wartime trails?"

A. "Dakotas, Liberators and Boeings."



Full-size mock-up of the "Air Horse." The first machine to be built will be used for pest destruction.

# Cierva "Air Horse"

## *A Three-rotor Helicopter with Three Tons Pay Load : Specially Designed for Pest Destruction*

HITHERTO one has been accustomed to think of helicopters mainly as small aircraft. The limiting factor of helicopter size appears to be rotor diameter, and in the present state of the art at any rate, really large size implies a multiplicity of rotors. Consequently it is not surprising that the new helicopter designed by the Cierva Autogiro Co., Ltd., and now being built under a recent agreement with Cunliffe-Owen Aircraft at the Southampton Airport for Pest Control, Ltd., is based on a three-rotor arrangement.

To Dr. Ripper, of Pest Control, Ltd., goes the credit for having foreseen the advantages of the helicopter type of aircraft for the destruction of pests. His patent has as its chief claim the utilization of the slipstream from a helicopter rotor for circulating the chemically laden spray so as to ensure that the poison reaches the undersurfaces of foliage, where the majority of the insects appear to concentrate. The Cierva company adapted an existing Sikorsky R.4 for experimental work. Artificial foliage was coated with a substance which would be discoloured by the spray from the helicopter, and it was found that the downwash from the rotor very effectively coloured the underside of the leaves, thus proving Dr. Ripper's contention.

### Rotor Loads

The Cierva company has now been entrusted with the task of building a very large helicopter (15,000 lb loaded weight) for pest destruction at home and in many parts of the Empire. If the scheme works as expected (and there is every reason to believe that it will) the undertaking may be of very great importance to the Empire, especially in these days of food shortage, when maximum yield of crops is so vital.

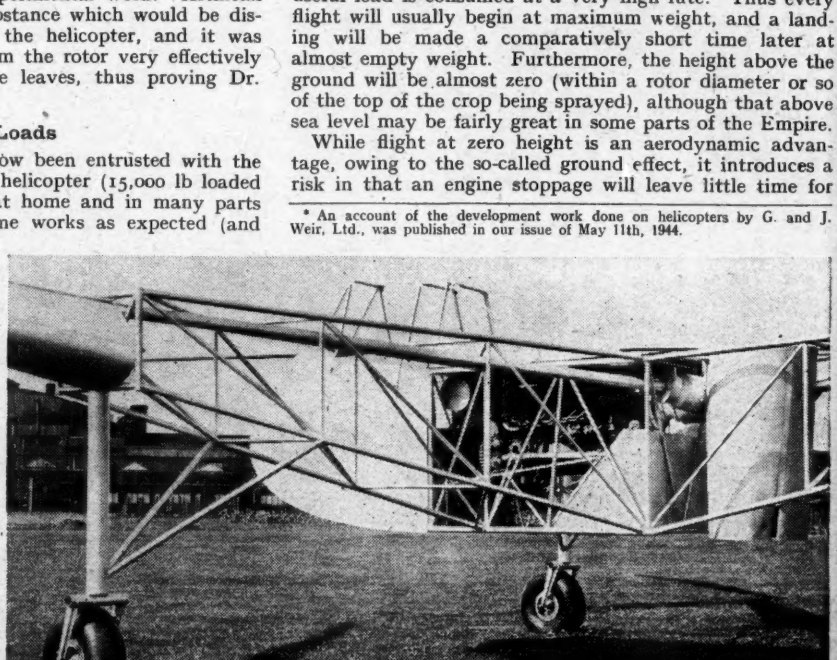
It is very fitting that the Cierva Autogiro Co., Ltd., should be the pioneers in this work, for that firm can be regarded as the mother of rotating-wing aircraft, and it has had, in conjunction with its licensees, G. and J. Weir, Ltd., long experience in the development of this type of aircraft.* Full use of this accumulated knowledge has been made in the design of the "Air Horse," as the new helicopter has been named. The only innovation introduced is the three-rotor arrangement, and as this should basically make for stability there is every prospect of success with this seemingly ambitious project. At a loaded weight of 15,000 lb, the average loading of each rotor will be only 5,000 lb., which is within the range of present-day experience.

### Operating Height and Range

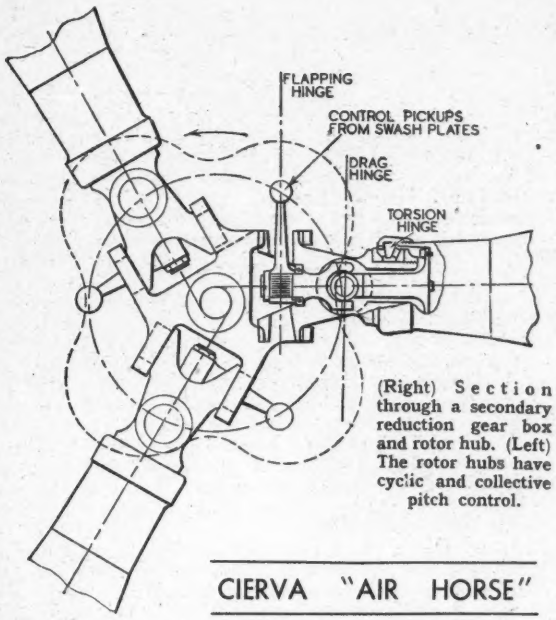
The working conditions of a helicopter designed specifically for pest destruction are somewhat unusual. Forward speed is unimportant, but great load-carrying capacity is required, and a remarkable feature is that the useful load is consumed at a very high rate. Thus every flight will usually begin at maximum weight, and a landing will be made a comparatively short time later at almost empty weight. Furthermore, the height above the ground will be almost zero (within a rotor diameter or so of the top of the crop being sprayed), although that above sea level may be fairly great in some parts of the Empire.

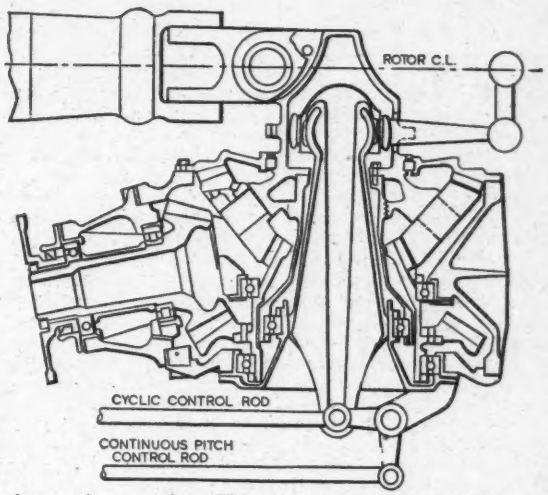
While flight at zero height is an aerodynamic advantage, owing to the so-called ground effect, it introduces a risk in that an engine stoppage will leave little time for

* An account of the development work done on helicopters by G. and J. Weir, Ltd., was published in our issue of May 11th, 1944.



A Merlin XXXII installed in the mock-up. Rotor drive is divided into primary and secondary transmission. An axial-flow fan with variable-pitch blades gives the desired mass-flow through the radiator under all conditions.




(Right) Section through a secondary reduction gear box and rotor hub. (Left) The rotor hubs have cyclic and collective pitch control.

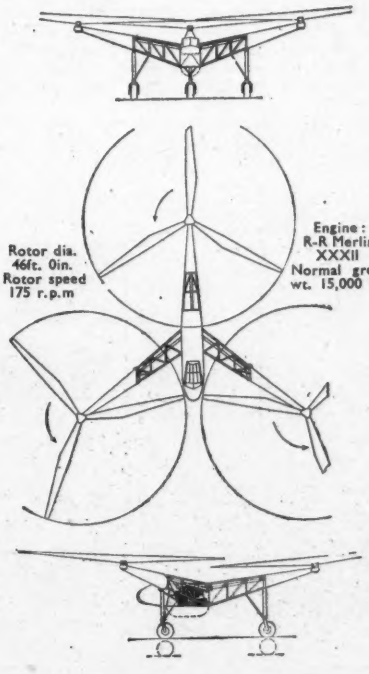
## CIERVA "AIR HORSE"

changing into autorotation pitch. That risk had to be eliminated so far as possible, and a very special undercarriage has been designed by Automotive Products. With a travel of 5ft, this undercarriage will it is calculated, dissipate the energy arising from vertical velocities up to 39 ft/sec, which should prevent damage to aircraft and occupants.

It has been thought desirable to point out the very special conditions under which the "Air Horse" will work in order to show the considerations which have led to such an unorthodox and not very "clean" design. Streamlining was of no importance, since the forward speed can be quite low, but accessibility of equipment, and very rapid replenishment of fuel and chemicals, were major considerations. If the machine should be wanted for other work, alternative and much more streamline designs are available. Even the 15,000 lb loaded weight of the "Air Horse" does not represent the maximum possible. With larger and superimposed rotors and more powerful engines, pay loads up to 10 or 12 tons can be contemplated. Similarly, the accommodation for crew, passengers and freight is capable of wide variations, according to the purpose for which the machine is to be used.

As will be seen from the general arrangement drawings, the three rotors are located with their hubs at the points of a triangle, as seen in plan, the three outriggers being spaced at an angle of 120 deg. to each other. Each outrigger carries a rotor hub, and all three rotors have the same diameter (46ft), the same hand of rotation and the same blade form. In that way the transmission is simplified, and interchangeability of all shafts, hubs and blades facilitated.

It will be obvious that with all three rotors running in the same direction torque reaction must be taken into account. This is countered by a slight inclination of the three rotor axes around the axes of the transmission shafts. This fixed setting has been selected for the hovering condition, and it amounts to no more than 3 deg 45 min. This produces a tangential force of 328 lb per rotor, at a radius of 27.4ft, corresponding to 906 h.p. from the engine at an engine speed of 2,400 r.p.m. The rotor speed is 175 r.p.m. The rotor blades are of tapered plan form and twisted. They are of composite construction, with aluminium and resin-bonded moulded plywood as the materials. The surface finish is Plastoglaze, and each blade weighs 128 lb.




The hubs of the rotors are arranged for cyclic and collective pitch control, and the blades have the usual flapping and drag articulation. The horizontal offset of the flapping hinges has been reduced to a minimum to promote smoothness of operation. The drag hinges are located outside the flapping hinges. The blade attachments are designed for quick incidence-setting and for easy removal and reassembly.

### Controls

With the particular rotor arrangement chosen, there is static neutral stability, and the system is aerodynamically stable. Control about the three axes is as follows: Lateral control by differential collective pitch of the two front rotors; pitching control by differential collective pitch change between the rear and forward rotors; and yawing control by differential cyclic pitch of the two forward rotors. The pilot's control is mechanical, but is assisted by hydraulic servo. The control column is linked to the distribution box in such a way as to provide all the necessary control movements together with trim adjustments and differential controls.

The power unit selected for the "Air Horse" is the Rolls-Royce Merlin XXXII, which is rendered very suitable for this special work by virtue of its great versatility in the choice of power output, r.p.m. and boost pressure. It was found that this engine could be used without modifications, the drives to the three shafts, and the special cooling equipment, being additions to the standard engine.

Mounted as it is in the centre of the aircraft, the Merlin did require a somewhat unusual cooling system, but this presented no great problems in view of past experience with the Weir W.9 helicopter, in which an axial-flow fan of variable pitch was used and proved satisfactory. This type of fan gives adequate cooling

## CIERVA "AIR HORSE"

under all conditions of hovering and translational flight, and it absorbs but some 2 per cent of the take-off b.h.p.

Transmission drive to three rotors presented something of a problem, but, all things considered, that evolved is not unduly complicated. It is divided into primary and secondary transmissions. The primary transmits power from the engine to secondary gear boxes, which form units with the three rotor heads.

The standard Merlin XXXII is fitted with a modified Borg and Beck type single-plate clutch. This clutch, the main function of which is to start the rotors, is capable of transmitting 150 h.p. only. At a predetermined number of revs the centrifugal ratchets of the positive dog clutch become engaged, thus relieving the clutch of further duty. The automatic ratchet type dog clutch also acts as a free-wheel or over-riding device in case of engine failure, and allows the rotors to autorotate in gliding flight. As the rotors are geared together, adequate control is retained. A simple arrangement of bevel gears distributes the torque to the rotor transmission shafts and thence to the rotor hubs. The standard Merlin airscrew reduction gear ratio of 2.095 : 1 has been retained.

### Rotor Drives

Large-diameter hollow universally-jointed shafts transmit the torque from the primary gear box to the secondary gear boxes under the rotor hubs. The shafts are supported at about mid-point by bearings in the outriggers and, to keep the gears within reasonable proportions, the opportunity has been taken to introduce a double-reduction gear. The gear ratio between primary and secondary is 6.55 : 1, which gives an overall ratio between engine crankshaft and rotors of 13.7 : 1.

The normal flying controls are a spade-grip column and rudder pedals. The clutch lever, combined with the brake for the rotors, is mounted at the side of the pilot's seat, the lever operating on a common drum at the rear of the primary transmission gear box. Connected with the control distribution box is the overriding collective pitch control, together with a visual indication of the blade pitch setting.

In a helicopter such as the "Air Horse," the rotors and their transmission system are all-important, and it may be said that the primary aircraft structure is of secondary importance. In this particular machine the fuselage and inner half of the outriggers are of welded tubular construction. The forward end of the fuselage is so designed that it can take different forms of cabin to suit any specific operational duties. The outer portions of the three outriggers are of stressed-skin construction.

### Spraying Gear

As for the special equipment needed for pest destruction, Pest Control, Ltd., proposed a main stainless steel tank of 500 gallons capacity, provided with ample vent pipes and fillers so as to permit of rapid "refuelling." A special three-stage centrifugal pump with an additional low-pressure stage is capable of delivering to the spraying system at a rate of 100 gallons per minute, and at a pressure of 350 lb/ sq in. The spraying gear is so arranged that the liquid can be sprayed into certain sections of the slipstreams. The whole equipment, including the 500 gallons of pest-destroying liquid, will, it is estimated, weigh about three tons.

It is calculated that with a three-ton payload (including equipment and personnel) the loaded weight of the machine will be 15,000 lb, but greater loads could be lifted. At 15,000 lb the power required to hover at one rotor diameter from the ground is 980 b.h.p., which leaves a take-off power reserve of 620 b.h.p. This should give a rate of vertical ascent of 1,440 ft/min, but this rate is considerably increased if a certain amount of forward speed can be employed. Under still-air conditions the maximum weight that can lifted from the ground when using full take-off power is estimated to be approximately 20,000 lb.

For pest destruction, as already mentioned, forward speed is of small importance, but the cruising speed should be about 88 m.p.h., and the maximum speed something like 115 m.p.h. The work on design and construction has now begun, and the performance of the machine will be awaited with great interest. The project is an ambitious one, but the Cierva company has had long experience.

## SUBMARINE SINKINGS

SOME interesting figures appear in the official booklet* issued by the Admiralty giving the particulars of the destruction of enemy submarines. Out of 781 German U-boats sunk, aircraft, either on their own or in conjunction with ships, were employed in the attack on no fewer than 415 of them. The figure for those sunk by aircraft alone is 369. The Italian and Japanese figures, however, show a preponderance of successes for ship attacks. Italy lost 85 submarines, of which 13 were sunk by aircraft, and of the total Japanese losses in U-boats of 130, aircraft were responsible for only 15.

The following is an analysis of German U-boat sinkings.

**SUBMARINE SINKINGS**

| Type of a'rcraft | Sinkings by a/c only | Sinkings aided by ships or other a/c |
|---|---|---|
| Sunderland | 25 | 6 |
| Swordfish | 13 | 6 |
| Unidentified (R.A.F.) | 24 | 14 |
| Hudson | 19 | 2 |
| Whitley | 4 | 1 |
| Unidentified (N.A.A.) | 1 | 1 |
| Catalina | 15 | 4 |
| Blenheim | — | 1 |
| Wellington | 24 | 6 |
| Lancaster | — | 1 |
| Liberator | 58 | 11 |
| Fortress | 12 | 1 |
| Wellesley | — | 1 |
| Albacore | 1 | 1 |
| Bisley | 1 | 1 |
| Unspecified a/c (by mines) | 16 | 2 |
| Hampden | 1 | — |
| Halifax | 9 | 1 |
| Beaufighter | 6 | — |
| Cams (French) | 1 | — |
| Brazilian | — | 1 |
| Mosquitoes | 8 | 1 |
| Avenger | 1 | 1 |
| Wildcat | — | 1 |
| Ventura | — | 1 |
| By American aircraft | 105 | 28 |

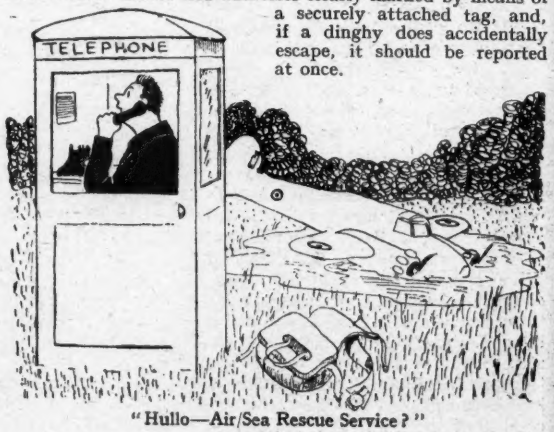
**German, Italian and Japanese U-boat casualties during the war. H.M. Stationery Office, 6d.*

## PUBLIC'S USE OF RUBBER DINGHIES

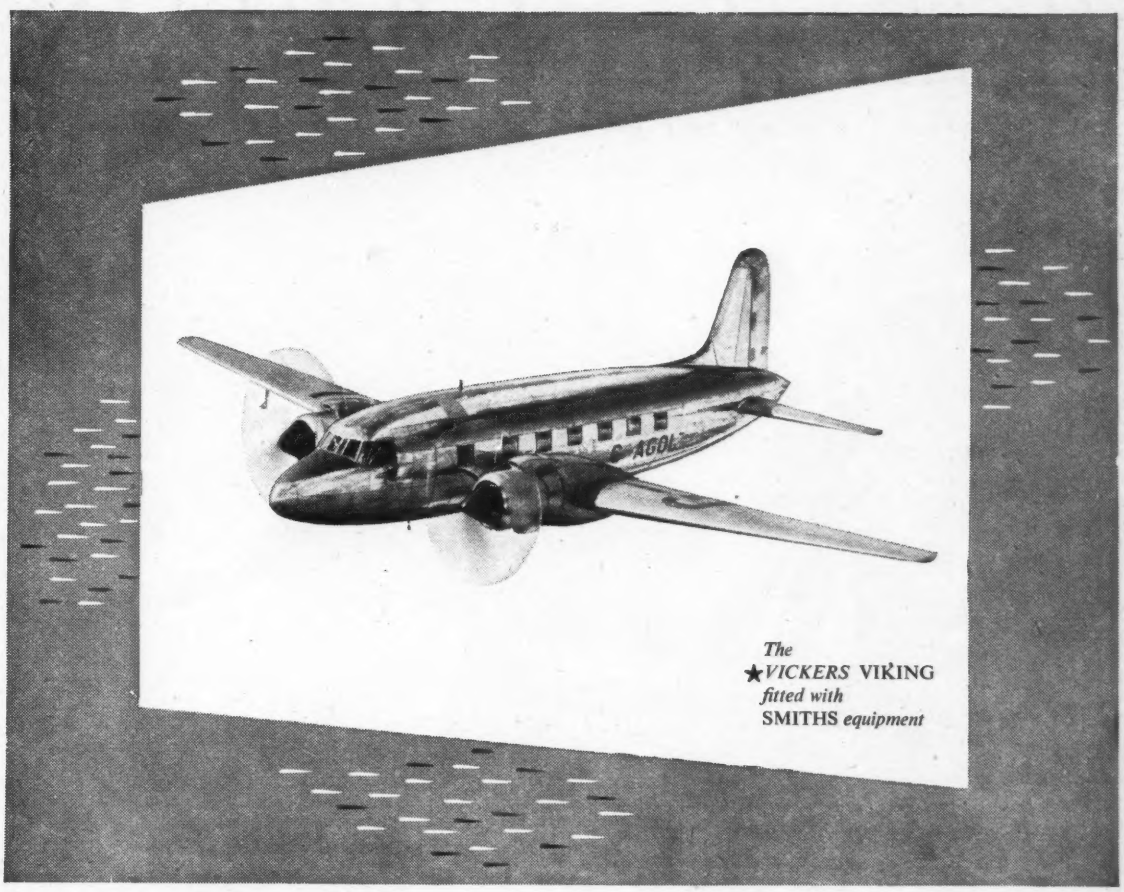
MORE than 100,000 surplus rubber dinghies of various types have been disposed of to the public, and the Air/Sea Rescue Service asks that care shall be taken, when these dinghies are used on bathing beaches, that they shall not be allowed to drift out to sea.

This has already happened on a number of occasions with the result that false alarms of "ditched" aircrew have put the Service to unnecessary trouble. Moreover it is pointed out that such false alarms might send aircraft and marine craft on wild goose chases just when their services were genuinely required elsewhere.

Privately owned dinghies, it is recommended, should have their owners' names and addresses clearly marked by means of a securely attached tag, and, if a dinghy does accidentally escape, it should be reported at once.




"Hullo—Air/Sea Rescue Service?"




# SMITHS Aviation Instruments have been selected by British constructors for their post-war civil aircraft.

★ *There are more than 80 separate items of Smiths Aviation equipment on every Vickers 'Viking'.*

SMITHS

A108

SMITHS AIRCRAFT INSTRUMENTS LTD

*The Aviation Division of S. Smith and Sons (England) Limited*

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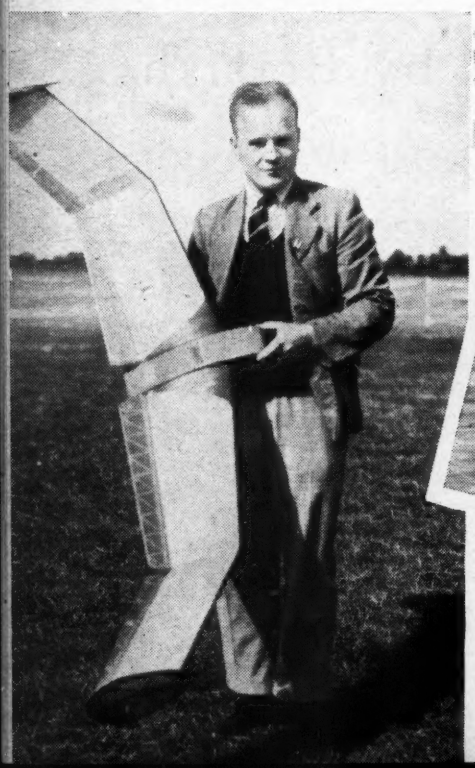
E1

# MODELS IN BRITAIN . . .

## *The Evolution and Present State of a Great Movement*
## *Instructive Recreation for Modest Outlay*

The young aeromodeller can always learn new "wrinkles" at one of the big meetings, as suggested by this scene at Hounslow. Keen competition does little to restrict interchange of technical information among thousands of devotees.

From some angles the high-efficiency sailplane makes a bizarre pattern. A snap from the Midland Area Rally, Hockley Heath.



The Handley Page contest for tail-less aircraft inspires some designs of exceptional interest and merit. Mr. R. E. Connor, winner of the 1945 contest, displays his entry.

There is an undeniable thrill in the take-off of a beautifully proportioned model, like this entry in a recent Hounslow contest.

High-set tailplanes are *de rigueur* among sailplane enthusiasts. A good example is displayed by Mr. Ed. Rogers on this broad-spanned creation.

Mr. Eddie Kiel with his realistic EK2 in the Sir John Kelly Cup, Hockley Heath, 1946.

Cloud Dozzer is Mr. R. V. Bentley's appellation for his striking parasol monoplane.

An earnest competitor prepares for the get-away on Hounslow Heath. The more elaborate and expensive models must be carefully "nursed."

THE value of model aircraft in aeronautical development is fully appreciated by readers of *Flight*. Already the exquisitely finished wind-tunnel models, hitherto pre-eminently important in aerodynamic research, are being supplemented by flying models for investigation into the problems of trans-sonic and supersonic flight, while piloted scale models are proving that they can pay for themselves as the prototypes of large or unorthodox aircraft. The piloted model, however, is an aircraft in its own right, and, like the model for tunnel research, has no place in the present discussion. Neither will consideration be given to anti-aircraft target models, the super-detailed masterpieces acquired at great cost by the large firms for exhibition, nor the familiar recognition models distributed by tens of thousands to all Services during the war. Rather this brief survey is intended as an introduction to the amateur model-making movement in Great Britain, a movement embracing sport, science and recreation, and springing from a desire for instructive pleasure among thousands of people, irrespective of sex or age.

That aero-modelling is desirable is generally accepted, but its benefits are not yet manifest to all. Mr. A. F. Houlberg, Chairman of the Society of Model Aeronautical Engineers, the oldest body devoted to the furtherance of the movement, affirms that model aeronautics develops primarily the use of the fingers and constructive ingenuity. Honest pride in manual skill is, in these times, sufficient reason for surveying more fully other advantages, not the least of which is the practice afforded in the use of mathematics and its applications to design problems. Draughtsmanship is developed and experience acquired in the elements of aircraft design. Outdoor recreation follows, since models must be taken to the open country for flying; moreover, as a good model will fly for one to five minutes and travel anything from a quarter of a mile to several miles, physical exercise is induced by the need to follow it and keep it in view for retrieving. Self control and perseverance are promoted by the unavoidable breakages and losses of machines.

Of all sports, supporters consider that model making and flying offers the highest educational value for the lowest outlay.

Model building and flying is no innovation; indeed the roots of the Society of

The INSULATOR of the

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the world's hardest ceramic (of the same hardness as sapphire).

Nothing but diamond is harder, and it will cut glass.

This perfect insulator is made solely in the Lodge plug factories.

Pink in colour, it possesses the highest insulating properties, is a most efficient conductor of heat, and is of astonishing mechanical strength.

No other make of plug in the world enjoys the unique advantages of "SINTOX" insulation, which is exclusive to

**LODGE**

Lodge Plugs Ltd., Rugby.

# MODELS IN BRITAIN

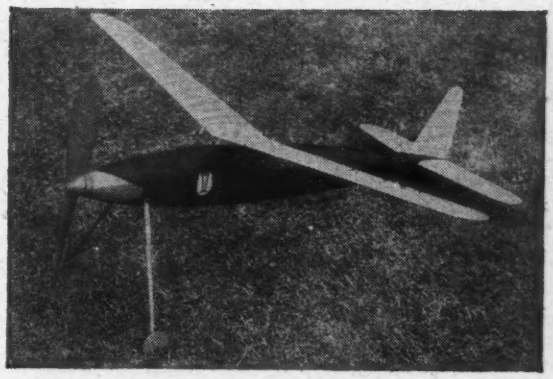
Model Aeronautical Engineers are to be found in the early nineteen-hundreds when flying was a vast adventure and the Wright Brothers, Bleriot, Latham, Farman, A. V. Roe and others were pioneering human flight. At this period the old Kite and Model Aeroplane Association was founded. The war of 1914-18 brought the Association's activities to a standstill but a small group of its pre-war members living in the London area was enthusiastic enough to revive the London Aeromodellers Association. They built it into a body which became sufficiently well established to take over the old K. and M.A.A. and virtually to become its legal successor, renaming itself the Society of Model Aeronautical Engineers and embracing the whole country in its scope. The spirit of the old Kite and Model Aeroplane Association, whose activities were regularly detailed in *Flight* up to the outbreak of the 1914 war, is perpetuated to-day in an annual contest for the K. and M.A.A. Cup, devoted to the development of biplane models.

### Premier Trophy

The K. and M.A.A. Cup is only one of thirty trophies which the S.M.A.E. offers yearly, including three international trophies, one of which, the Wakefield Cup, has become the premier international model aircraft trophy of the world. Presented by the late Viscount Wakefield in 1927, this trophy has been won by Great Britain five times, America five times, and France once. It is at present held by America by virtue of a fine 43-minute flight by Dick Korda at New Jersey in 1939.

The S.M.A.E. has been delegated by the Royal Aero Club to control all national and international contests in Great Britain and to ratify official model aircraft records. It has also been authorized by the Royal Aero Club to issue F.A.I. Model Aircraft Competitors' licences, which are essential if world records are to be claimed, and F.A.I. Model Aircraft Certificates, granted for an observed flight of at least three minutes with a rubber-driven model or one of at least five minutes' duration with a model glider.

**The enthusiasm of the true model maker is only equalled by his enterprise. An experimental tail-first glider is displayed.**



**Mr. A. F. Houlberg's *Flying Minutes*, a beautifully designed and constructed model worthy of the S.M.A.E. badge it bears.**

Amongst its international achievements, the Society won the first contest for the fine trophy presented for international competition by King Peter of Jugoslavia in 1938. On this occasion the team sent by the S.M.A.E. to represent Great Britain almost swept the board, Bob Copland making a world record flight of 33 min 7 sec.

The membership of the Society consists mainly of affiliated clubs, of which there are some 130 at the moment, though this number is increasing rapidly month by month as fresh clubs are formed and old clubs resurrected. For those out of reach of a local club, Country Membership is offered at a guinea a year.

Affiliated clubs are grouped into "Areas" with their own administrative councils and officers organizing flying meetings and contests.

A younger body which has got well into its stride within two years is the Association of British Aeromodellers, which advises on all modelling problems and watches legislation. The association maintains a unique reference library covering all aspects of aeromodelling.

The illustrious name of Dr. H. Roxbee Cox is connected with the Low Speed Aerodynamics Research Association which studies problems peculiar to low-speed flight. The Director of Research is Mr. N. K. Walker.

Backed by such helpful and enterprising bodies, the aeromodeller has only to find himself a suitable flying site. The big clubs have their own venues in suitable country, and there is a "Model Sportdrome" at Eaton Bray. Aircraft manufacturers—in particular Handley-Page, Hawker and Fairey—generously loan their airfields for special events. Only last week-end the Hawker airfield at Langley was the scene of the Northern Heights Model Flying Club Gala, a short account of which appears below.

Members of 80 Clubs attended this highly successful meeting which attracted over 900 entries in eight varied items.

Specialists in every branch of aeromodelling had the opportunity to win useful prizes. The current rubber shortage did not seem to trouble the many competitors who entered designs for the open duration rubber contest, won by D. Lees, of Bradford, with a flight of just over eight minutes. The smaller number of petrol-engined types attracted much interest among the spectators, who had to scatter on more than one occasion when models dived into the centre of a crowd.

Perhaps the most keenly contested event was the *Flight* Cup, awarded for the longest duration by a glider. Despite unfavourable gliding weather there were over 270 entries for this contest, which was won by P. Brown, of St. Albans, with 321.4sec.

During the lunch interval Hawkers provided full-size entertainment display by the Tempest II and Sea Fury.

# Cairo Cameo

## *Suez Canal and Three-Dimensional Defence : Cyprus as an Aircraft Carrier : More Passengers by Air than Ship*

By B. J. HURREN

EARLY one morning, as a sweltering sun gave promise of a grilling day, a burly Sudanese produced a newspaper in which the star news was the debate on the question of the defence of Egypt. I had come to Cairo from London in a B.O.A.C. "Hythe" class flying boat, an exceedingly comfortable journey with one overnight stop at Augusta, Sicily, so that I was very up-to-date with English opinion.

Let me say at once that this is not going to be a political review, but that local Cairene opinion among informed men of affairs differs as much from current English thought as chalk from cheese. Far from deploring the movement, which is known loosely in England as the sell-out, here competent authorities regard the matter with approval. This statement of fact is at such variance with the general view in England that a short discursion on the state of affairs here may be worth while, especially to those who contemplate business affairs in the Near East.

In the first place, it is essential to appreciate the tremendous change which has come over Egypt, and kindred states, in the past two decades. This change in outlook is complete and permeates through all ranks and conditions of men. It derives not so much from aviation as from radio and the films.

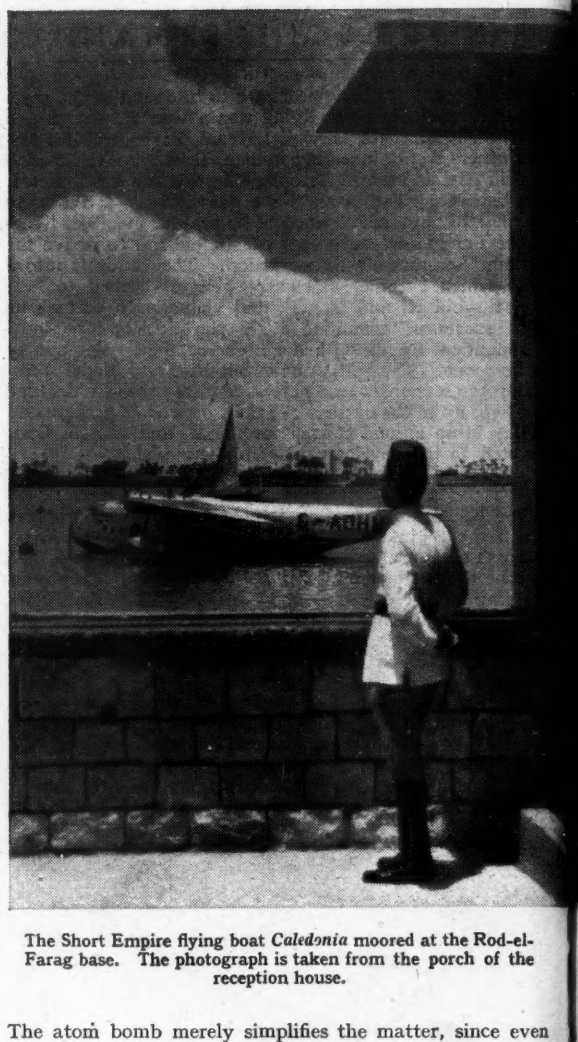
Egypt is to-day much more than a highly fertile geographical zone. The zero line of the world's magnetic field passes directly through Egypt, roughly north and south, and this may be taken as symbolic. For modern Egypt is neither East nor West, neither Old nor New, but the compound mixture of something unique in the Past, revivalist in the Present, and certainly complex Tomorrow.

This ancient State, which for 5,000 years has borne the yoke of many a conqueror but has always in the end ejected the conqueror, by the chance of geography lies athwart the arterial line of communication with the British Empire east of Greenwich. The Canal (and there is only one Canal to the English) has, therefore, been a governing point in British foreign policy and military strategy since Disraeli made a smart business deal, and the major part of British commerce was borne on its waters. The defence of that Canal has, until recently, rested primarily on the Royal Navy, although a holding force of the Army was, by treaty agreement, kept at key points. The advent of air power altered the picture considerably in that it removed from the Navy much of the responsibility for defence; for enemy aircraft could approach Suez without crossing the sea at all.

### Suez Canal and Air War

In short, and somewhat unscientifically, the two-dimensional problem of defence that faced *fin-de-siècle* militarists has been replaced by a three-dimensional one. The Second World War showed to our considerable discomfiture that the Suez Canal could be closed for weeks. (Indeed, the remarkable thing is that the Germans failed to intensify their attacks and close it completely by destroying the banks where the Canal rises above the Sinai Desert, on its east side.)

The fact, already proved, must be accepted that a determined enemy could close the Canal easily by air assault.



The Short Empire flying boat *Caledonia* moored at the Rod-el-Farag base. The photograph is taken from the porch of the reception house.

The atom bomb merely simplifies the matter, since even the most rabid humanitarian could not object to atomizing a lot of sand, completely uninhabited, where the Canal is most vulnerable to air attack.

Therefore, the expression "Defence of the Canal" is already an archaism, of interest to historians writing of the pre-Atomic Age. To-day, realistically, all the King's aircraft and all the King's men, to say nothing of the battleships, could not stave off bomb attacks calculated and designed to destroy Suez. So the answer to those, particularly in Australia, who naïvely ask what they were fighting for in the Western Desert, is that they were fighting in another era, a time when it was possible to defend the Canal in part, although even then the Canal was closed by enemy action. As, however, war secrecy forbade mention of that fact, there may be some excuse for the barren thinking that still remains on this subject.

Where could attack come from? Not from the south, nor from the east, nor from the west, under the present set-up. The only possible line of attack lies in the north, and could embrace the sector NW-NE. Right in the midst of this sector lies an important British possession, alack too often forgotten. I refer to the enchanting island of Cyprus which, like some enlarged Malta, provides an unsinkable aircraft carrier set as a bastion to the Canal some 300 miles to the south.

Cyprus, clearly, could be reinforced by direct flight from England without any difficulty at all, and in a matter of a very few hours. It is, curiously and satisfyingly, of suffi-

Catering officer C. E. Woolf, of B.O.A.C. inspecting the Egyptian staff who look after the air passengers' comfort on the houseboats.

cient distance from Port Said to make it almost ideal for ultra-high-speed jet aircraft to intercept any potential raider, since the 300 miles' "grace" accorded to the defence planners would be ample time for defence fighters to overtake and destroy bombers heading for the Canal from the north. A counterpart defence base at Aden, though farther distant by far, would cover for the south; and yet another cover base in the east would close the circle to all—unless it be the Pocohontas in the west.

That is the position as seen here in Cairo, and the corollary must be that for British troops to march in the steps of Gordon and Kitchener is no longer justifiable in this our Atomic Air Age.

The effect of the departure of British troops may be compared with unplugging an electric light lead. Many lights will go out in Egypt, and the fair weather of economic prosperity, which the British have so long provided for Egypt, may give place rapidly to a falling glass, with the Egyptians seeking our trade and custom as never before.

Earlier in this message I referred to the great change introduced by radio and film. Until these Twentieth Century technical achievements came to the East, there remained a large degree of respect, tinged with mystery and awe, for Western Civilization. To-day, the separating distances have been annihilated and the veils lifted. Every native knows what the British are like; he has seen them in hundreds of thousands, and is kept in contact hourly by radio with places thousands of miles distant. The films have shown intimately how people of the West live, and their customs can be imitated easily. Thus, the barriers of yesterday have been broken down, and the Man in the Egyptian Street regards himself as every bit the equal of anyone in the West. For, apart from the squalor of the native quarters, the great cities of Cairo and Alexandria are immeasurably superior to any in England; in fact, you could take any of the main streets in Cairo straight to Paris, Brussels or Rome and find that they shamed the Western capitals.

The point about all this is that the British will have to learn a new technique of approach. Here, already, is luxury far beyond the dreams of the vast bulk of British cities, but here you will not find the great industrial cities which make England and Scotland of such importance in world affairs.

### New Approach

Deriving from this is the simple fact that, in particular, advertisers will have to re-orientate their ideas of approach by the written word. The advertisement which shows a simple black man in a coloured loin-cloth gazing spell-bound at the latest aerial wonder, is likely, if anything, to create animosity and resentment; for the modern race-proud Egyptian that approach is as absurd as a frock coat and silk hat in Basutoland. On the other hand, the advertisement which sets out the industrial power of the English firm concerned is likely to ring a new bell, for Egypt remains basically an agricultural State, unaware of the mighty steel furnaces and the vast industrial enterprises symbolized by the new towering condensers at, say, Coleshill, Birmingham.

In present circumstances it may be inappropriate to discuss the military air picture in Egypt, which is Cairo, but the civil aviation story gives a clue to the future. According to B.O.A.C., where an efficient unit operates at Rod el Farag and Almaza at full pressure, today some 9,000 and more passengers await air passage to Britain with such patience as they can muster after six hot summers abroad. Further East, banking up as it were, lie an incalculable number of British overseas, all anxious to return to England for longer or shorter spells. The build-up today is such that nobody is looking for work—there is far too much already on the plate. Last month the traffic returns (which are average) show that twice as much first-class passenger traffic was borne by air as by ship. Though sober consideration of these statistics indicates that the boom is in part artificial, since the travellers would accept any available means to get home. For many weeks past no big ship has left Egypt for England, although on May 27th the *Ascania* was due to cart off some 3,000 people under conditions which simply cannot compare with B.O.A.C. or American air travel. Incidentally, the American service from Payne Field, Cairo, hardly enters into competition with B.O.A.C. services. Only a small fraction of the American complement ends its journey in England —most bookings are through to America.

Will the civil aviation traffic boom last? Informed opinion regards a period of 18 months of hard pressure as likely to follow present commitments, and then some relaxation may be expected as (a) the demands of home-starved passengers are satisfied, and (b) more aircraft join the routes. On the other hand, Englishmen now going abroad to resume or start operations on post-war civil work will, in the period 18-24 months ahead, expect home leave, so that after a temporary drop the figures will tend to rise again. These estimates take account only of business or official travel. The imponderable factor of how much holiday traffic will go thousands of miles by air for pleasure purposes remains anyone's guess, although shrewd observers consider that the specialists in Harley Street who once recommended a fortnight at Bournemouth or Scarborough may soon be lightly—may I say, airily?—suggesting a trip to Cairo, Cape, Khartoum or Kandahar.

This rosy picture has an obverse. If there is to be a stream of first-class air passengers such as never before, it is clear that these *oiseaux de passage* will need vastly

(*Concluded at foot of page* 18.)

# Fifty Years of Flying

## A Remarkable Autobiography by Griffith Brewer

A REVIEWER of *Fifty Years of Flying** who has the good fortune to know the author is faced with some perplexity. Here is a book which one reads through at one sitting, not because that is necessary—most of the chapters can be read separately—but through being held by the sheer fascination of both subject and treatment. And then comes the uneasy query: Are you sure your liking for the book is not due, in large measure, to the fact that it is so like Griffith Brewer, in fact *is* Griffith Brewer? One can almost hear his soft-spoken sentences and the quiet deliberation which are so characteristic of him, and his unaffected modesty is reflected on every page as in a mirror. And how typical of the author are the occasional humorous asides and anecdotes.

Finally one arrives at the conclusion that this book will impress the ordinary reader as a remarkable account of the remarkable life of a remarkable man. The privilege of knowing him certainly adds to the enjoyment, but even without that advantage this account of half a century of flying, written as it is from personal experience, cannot fail to interest, amuse and instruct.

At the age of 79 Mr. Griffith Brewer has not merely watched the air evolution from the balloon of the 'nineties to the Meteor doing 600 miles per hour, he has flown in many types and holds a pilot's certificate for balloons, and American and British licences for heavier-than-air craft. The first was obtained in 1891, the second in 1914, and the third in 1929. Not only so, but he owned and flew his own Moth until shortly before the outbreak of the recent war. In between he learned to fly the Autogiro. His loves for both lighter and heavier-than-air overlapped, for his last balloon flight was made in 1922, fourteen years after he had made his first flight with Wilbur Wright as the first Englishman to fly as a passenger in a heavier-than-air flying machine. Kite balloons were another of his activities, and before that he had some experience, with S. F. Cody, of man-lifting kites.

*"Flight" photograph.*

**The author of "Fifty Years of Flying" surveying some photographs of his early exploits in the days of spherical balloons.**

Mr. Brewer has travelled widely and by all manner of craft, balloon, landplane, flying boat and airship, in addition to surface transport, and of his journeys he writes entertainingly so that the reader feels he is accompanying the author rather than merely reading an autobiography. It is as if one were told: "Come along, and I will show you how we did it."

This intimate touch is nowhere better conveyed than in Mr. Brewer's chapters dealing with the Wright brothers and their sister Katharine. He became a very close friend of the Wrights, and still keeps in touch with Orville. The aeronautical world cannot be too grateful that this fine friendship grew up; without it we should not have had such an intimate picture of the fathers of flying as that which Mr. Brewer paints for us.

It is not of the famous Americans only that Mr. Brewer writes. He knew all the British pioneers as well, men such as C. S. Rolls, the Short brothers Horace, Eustace and Oswald, Alec Ogilvie, Cody and many others, and they are duly mentioned at the appropriate periods. But one feels that somehow he was closest to the Wrights.

Lord Brabazon of Tara, who contributes a foreword, evidently has the same feeling. He puts it very neatly by quoting from Shakespeare's *Henry the Eighth*, where another Katharine, the Queen, said:

"After my death I wish no other herald . . .
but such an honest chronicler as Griffith." C. M. P.

* "Fifty Years of Flying," by Griffith Brewer. Published by the Air League of the British Empire. Price 10s. 6d.

## CAIRO CAMEO

*(Concluded from page 17)*

more hotel space than at present. One can imagine the successful tackling by B.O.A.C. of the intricate problems of staff and travel arrangements, but the imagination shies at the provision of adequate hotel accommodation at many junction and mainline stations on the world's trunk air routes. Once a wag prophesied that the rate of expansion of the Royal Air Force depended on the rate at which the grass on airfields could grow. Similarly, to-day it may seem a paradox, but almost certainly the rate of air travel may be governed by the speed at which first-class accommodation is provided along the line.

To sum up: the Canal Defence question is not regarded as a headache in Egypt, and the verbose and antiquated opinions pouring from certain quarters in London are regarded despairingly. The civil aviation picture is crowded and on the threshold of big developments. The business is here, and the call is the old one of "Come and Get It." It is an opportunity not likely to repeat itself.

*Civil Air Transport, by Group Captain W. E. Wynn, O.B.E. Hutchinson's Scientific and Technical Publications, 16s net.*

IN the preface to this book the author apologises in case the tide of events in civil aviation should have overtaken the contents of his book before it could be published. Something of the kind has in fact, occurred, but, nevertheless, and making allowance for this, one feels that the book has somehow misfired.

Perhaps with an eye to staff college edicts, the author has made a plentiful use of headings and sub-headings, and, while this may be excellent in a "Service paper," it is rather disconcerting in a normally published book to find, sometimes, as many as four central headings on one page. After a time, one tends to look ahead apprehensively in order to see how many more such breaks there are in the flow of the writing, particularly as so many of the headings are identical.

In order to prove his various points, the author is very free with extracts from official documents and introduces numerous statistics. The latter are freely interpolated in the text. The result is an unhappy mixture of facts and discussion insecurely linked together which makes the book difficult to read. If the author had obeyed another staff college precept—that of relegating tables and statistics to an appendix—it would have been an altogether happier arrangement.

Group Captain Wynn has much to say about civil aviation and draws many accurate conclusions, but, at the end of it all, the reader is rather too bewildered to be sure that he has really gained any entirely new knowledge about the subject.

C. S. W.

## *Another Civil Aviation Debate : American Angle on Charter : U.S. Internal Line Revenue Losses*

# CIVIL AVIATION NEWS

**TRANSPORT IN MINIATURE : According to a Government spokesman some very useful orders have already been placed for the D.H. Dove feeder-line transport, which, though listed as a Brabazon type, has been very largely a private venture.**

### *B.O.A.C.'s ATLANTIC*

LAST Monday, July 1st, B.O.A.C. restarted their North Atlantic services with the departure of their first Constellation, *Bristol II*, from London Airport, Heathrow, for La Guardia, New York.

### *MORE AIRFIELDS*

NINE more permissible landing grounds have now been released for use by private owners and charter operators in various parts of the country. These are Ballykelly, Dumfries, Llandow, Lossiemouth, Silloth, Southport (Birkdale Sands), Southport (Hesketh Park), Thornaby and West Malling. The use of each is subject to prior permission being obtained either from the C.O. or the aerodrome licensee. All but two, those at Southport, are restricted in use to aircraft on charter services.

### *TRANSATLANTIC DOUBLE*

A SERVICE linking Holland with Buenos Aires is to be started on October 1st by K.L.M. This second trans-Atlantic K.L.M. route will be from Amsterdam by way of London, Lisbon, Dakar, Pernambuco (Recife) and Rio de Janeiro, and D.C.-4s will be used. Initially, the service will run twice weekly, leaving Amsterdam on Tuesdays and Fridays, and the schedule will be arranged to link up conveniently with a number of European air lines. Incidentally, K.L.M.'s existing Carribean network will then be linked with both the north and south trans-Atlantic routes.

### *OLLEY AIR SERVICE AGAIN*

AFTER a war-time service as a member company of the Associated Airways Joint Committee, Olley Air Service have now resumed operations from Croydon as an independent concern. At the moment the aircraft being used are DH Rapides, but a fleet of DH Doves is on order for delivery later this year, and the company has very extensive plans for the future. In fact, we hear that the aircraft are more or less completely booked up until the end of September.

On July 1st, Mr. S. A. Carter, who for the past three years has been personal assistant to the deputy general manager of the Southern Railway, and for seven months secretary of the Railway Air Committee, joined Olley Air Service as Commercial Manager. Nowadays, with the necessity for so much pre-arranging and planning in charter work, this post is one of considerable importance.

### *TRANSPORT FUTURE*

DURING a debate on Civil Aviation in the House on June 26th, Mr. Arthur Woodburn, Parliamentary Secretary to the Ministry of Supply and Aircraft Production, made one or two interesting statements on the future of British transport types. We already had, he said, 350 civil aircraft on order ranging in all-up weight from 2 to 120 tons. Pure jet transports would not, however, be flying before 1950, and he gave this date as that on which the first production turbine-airscrew Brabazon I might be expected to be in service.

A long statement was also made by Mr. Ivor Thomas, the Parliamentary Secretary to the Ministry of Civil Aviation, with regard to the various civil aviation agreements which have been made during the past few months between the U.K. and a number of other countries. He particularly stressed the differences between these various agreements and, in the cases of the agreements with Eire and with Italy, went into great detail in an effort to allay disquiet. A longer report of his statement will be included in next week's issue of *Flight*.

### *GLASGOW'S AIRPORT*

THE flightway of the proposed third runway at Renfrew does not affect property controlled by the Clyde Navigation Trust and the Clyde Valley Power Company. Property belonging to those and other bodies are, however, affected by the flightways of the existing first and second runways. This information was given by the Parliamentary Secretary to the Ministry of Civil Aviation recently, and he added that discussions between these bodies and the Ministry and other Government departments concerned were in progress in order to find a satisfactory solution to various problems which had arisen.

### *CALLING AT PRESTWICK*

WHEN Trans-Canada Air Lines begins to use London Airport as its terminal in the United Kingdom for trans-Atlantic flights, it will, nevertheless, continue to be the policy of the company to make Prestwick a port of call in each direction between Montreal and London. As from the beginning of this month T.C.A.'s trans-Atlantic flights have been increased to six weekly in each direction, plus a seventh "special" flight. The company has also announced that its services between Canada and the United States have been speeded up from July 1st, with the inauguration of a new direct service from Toronto to Chicago.

### *ANGLE ON CHARTER*

FOLLOWING a recent investigation by the U.S. Civil Aeronautics Board, two U.S. air charter operating companies, Page Airways and Trans-Marine Airlines, have been ordered to cease engaging in scheduled air transportation in violation of the Civil Aeronautics Act. The case is particularly interesting in view of the difficulties which have been encountered during the Committee stage of our own Civil Aviation Bill over the definition of "charter work," and it throws some light on the official American attitude.

It appears that in the case of Page Airways a substantial number of schedules were operated between New York, Washington and Miami, and that the number of "contract" passengers carried was relatively small as compared with the number of "general public" passengers. In addition, various travel agencies and employees of Page Airways had been actively engaged in arranging the carriage of public passengers and cargo, and in ensuring that, so long as space was available, no member of the public was denied accommodation.

In the Trans-Marine case a regular service had, to all intents and purposes, been provided by the company between Massachusetts and New York, and the nature of the company's advertisements and other contacts with the public virtually

# CIVIL AVIATION

promised a service which had a degree of regularity contrary to the provisions of the Act.

Further, the fact that the names of the two companies concerned included either the word "airlines" or "airways" was considered by the C.A.B. to be indicative of the fact that the companies provided a regularly operated transport service.

It is noteworthy that the C.A.B. considers that the term "non-scheduled service" has a far more restrictive meaning than the mere absence of a publicised timetable. The Board declares that the irregularity of service necessary to secure exemption from full economic regulation is that which neither directly nor indirectly leads the public to believe that, between given points, a reasonably certain number of flights per day or per week, or flights at approximately certain times or certain days, may be anticipated with a reasonable degree of assurance.

## *AIRPORT CAR HIRE*

SEVERAL car hire companies have been offered non-exclusive rights by the Ministry of Civil Aviation to operate at both the London Airport and at Northolt. The rights will cover an experimental period only as, at present, no proper office accommodation or surfaced car parks can be made available at either airport. In the case of London Airport, the experimental period will be three months, and at Northolt six. At the end of those periods it is hoped that this airport car hire service may be put out to tender.

## *MODERNIZING MET?*

THE wet weather on V-Day had its repercussions in the House of Commons on June 19, when Air Comdre. Harvey asked the Under Secretary of State for Air if he would take steps to see that the Meteorological Service was improved so as to avoid misleading the public. The Under Secretary of State said that the Meteorological Service was already organized on a national basis, and that it was to be far larger than it was before the war, but could only be built up gradually owing to the release of war-time meteorologists and to the time taken to train scientists to fill these posts. Mr. W. Shepherd suggested that the paraphernalia of this expensive and apparently unreliable service should be abandoned and that a few aged farmers with well-developed corns should be employed in its place.

## *GOING DOWN?*

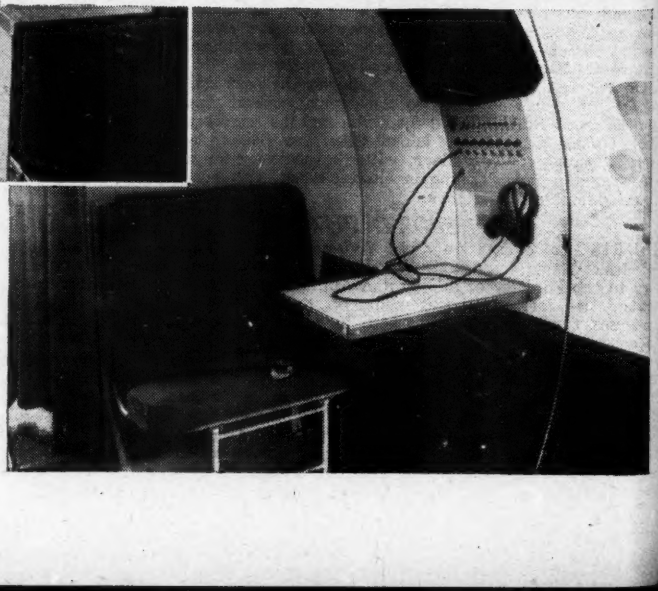
LAST month, the United States Civil Aeronautics Board announced that, for the first month of 1946, reports filed by the twenty domestic air carriers of America indicated a net loss from operations of 1,295,490 dollars as compared with the net profit of 2,479,820 dollars for the same period last year. A detailed comparison of the figures shows that in spite of this loss in revenue, the revenue miles flown increased by about 6½ million, and the revenue from passenger operations went up 50 per cent. However, there was a disproportionate increase in operating expenses which, for January, 1946, amounted to almost a dollar for every revenue mile flown.

For the year ending January 31, 1946, the net operating revenue for all domestic air lines was only 30,210,576 dollars as compared with 37,120,519 for the previous year.

## *THE CONSTELLATIONS' CREWS*

A PROVISIONAL list of the pilots who will be flying the B.O.A.C. Constellations between London and New York after July 1st includes the names of twelve who have flown the Atlantic more than a hundred times and, in some cases, more than a hundred and fifty times.

Led by Capt. O. P. Jones, one of the very senior B.O.A.C. captains, the Atlantic team probably includes more concentrated flying experience than that available on any other international route. Capt. A. C. Loraine, for instance, took



**TRANSATLANTIC CABIN:** The interior arrangement of B.O.A.C.'s Constellations is clearly demonstrated in these photographs of BANGOR II taken by a "Flight" photographer. The standard layout is followed. All the seats are fully adjustable and, in the upper picture, the inner seats are seen in the reclining position. Armrests are fitted with concealed ash-trays and each pair of seats has its call-button and reading light switches. (Above) The galley in the foreground, and behind it, the crews' rest compartment leading into the control cabin. (Right) The steward's position is immediately abaft the cabin entrance, with light and heat controls, and call-board.

# CIVIL AVIATION

the Short *Clyde* on the 12,000-mile survey route to West Africa at the time when, on the entry of Italy into the war, the Mediterranean had been suddenly closed to air traffic. Capt. J. W. Burgess flew the original Short *Centaurus* boat on its first survey flight to Australia in 1937. All other pilots in the team—Capts. L. V. Messenger, G. R. Buxton, W. L. Stewart, R. Allen, A. Andrew, K. E. Buxton, P. C. Fair, V. W. Glasheen, B. O. Prowse, J. Woodman, C. H. Pentland, J. T. Percy, D. I. Peacock, W. J. Craig, W. S. May—have had extensive Atlantic experience, either with the B.O.A.C. Return Ferry service Liberators or on the regular Boeing flying-boat run between this country and Baltimore.

## *ANOTHER U.S. AIRLINE ORDER*

NORTHWEST Airlines have recently ordered forty Martin 303s. The 303 is a 38-passenger twin-engined pressurized transport, and the first should be in service before next summer. It is estimated that it will have a gross take-off weight of 36,750 lb, and a cruising speed of approximately 300 m.p.h. with exhaust ejector assistance from the Pratt and Whitneys. A form of this assistance, as applied to the Consolidated Vultee 240, was described in *Flight* of May 23rd.

## *LATIN AMERICAN SERVICES*

TOWARDS the end of last month the U.S. Civil Aeronautics Board issued a decision on the extension through Central and South America of the services of nine U.S. airlines. The extensions had been under consideration for more than a year, but have now been approved by President Truman subject to certain changes in the recommendations of the Board.

Among the authorizations, Braniff Airways, which operates in Central U.S., can now extend its services to Rio de Janeiro and Buenos Aires; Pan American Grace Airways (Panagra), which operates services along the west coast of South America, can conduct a non-stop service between Balboa and Buenos Aires via Guayaquil, Lima and Antofagasta, and also a service between Buenos Aires and Montevideo; Pan American Airways can operate from New York to San Juan, thus directly linking the services to Europe and to South America; and Colonial Airlines, which at present operates between the U.S. and Canada, may now operate from New York and Washington to Bermuda.

## *INTERNATIONAL AIRWORTHINESS*

THE final report of the first session of the Airworthiness Division of P.I.C.A.O. has now been completed. Designers and others are now asked to comment on this report before the Air Registration Board advises the Ministry of Civil Aviation to agree or otherwise to the adoption of the findings.

It would obviously be impossible for anyone who has not either followed the proceedings, or spent a considerable amount of time in a study of the recommendations, to make any very constructive comments. In order to assist those interested, the Air Registration Board has, however, produced some notes which effectively cover the differences between the present British Civil Airworthiness Requirements and the International Requirements recommended in the report. The differences are surprisingly slight, and in some cases, even, the British Requirements are more difficult to satisfy. Throughout the discussions at Montreal the Airworthiness Division bore in mind the probability that requirements of a somewhat less stringent nature would be established for aircraft in other classes. These would cover aircraft other than those in use on scheduled international services. There is no reason to suppose, therefore, that the standards in the Report will necessarily need to apply to aircraft in use for charter work, for which single-engined aircraft will be permitted. Any national authority is permitted to vary the standards in detail provided that an equivalent degree of safety is maintained and this latitude will certainly be useful. The recommended date for the final enforcement of the new standards is January 1st, 1951.

# *BREVITIES*

### UNITED KINGDOM

A personal letter of congratulation has been sent by the Minister of Civil Aviation to the four B.O.A.C. pilots who have each flown over two million miles. They are Capts. E. S. J. Alcock, G. W. Bellin, F. Dudley Travers, and O. P. Jones.

* * *

Although there are no services using it at present, Ringway Airport, Manchester, will be included in the schedule of routes to be operated by British European Airways Corporation.

* * *

Negotiations are now in progress to provide refuelling facilities for private aircraft at Elmdon Airport, Warwickshire, in the near future. A civil ground organization is being established, and the airfield will shortly be available for private flying.

* * *

During their first post-war year of operation, Channel Islands Airways have carried 39,850 passengers and more than a million pounds of mail and general freight. A great deal of this freight has been flown on the special early morning service from Southampton, started on September 10th, 1945, for the conveyance of newspapers and mail to the Islands.

* * *

Approach and runway lights have now been installed on the east-west runway of London Airport, Heathrow. An hour's notice is required by the control officer if these lights are to be brought into operation. They consist of the usual outer, centre and inner funnels, with angle of approach lights, flush-fitting screened lights in the runway itself and unscreened contact lights on its edges.

### EIRE

A twice-daily service in each direction between Glasgow and Dublin is planned to begin during this summer. It will be operated by the joint company, Aer Lingus Teoranta.

* * *

Aer Lingus has a new booking office at 2, The Crescent, Limerick, which will remain open daily from 9 a.m. to 6 p.m. After 6 p.m., bookings may be made at the Shannon Airport.

* * *

Imports of aircraft and their equipment into Eire in February last amounted, in value, to £15,244, bringing the total for the first two months of the year up to £40,490, compared with only £5,861 in the corresponding period of 1945. The sharp rise was due to the purchases of new equipment for Aer Lingus.

### AUSTRALIA

The quantity of air freight carried from Australia by Qantas has been steadily increasing recently, and has now reached the figure of 50,000 lb a month.

* * *

The Civil Aviation Department in Australia has partially relaxed its priority regulations, and five seats in the Hythe flying boats are now available for non-priority passengers on each trip. This relaxation does *not* apply, however, to the Lancastrian services.

* * *

It has now been announced that Australian National Airways will, with four Douglas DC-4s, operate the trans-Pacific service for twelve months until Commonwealth Pacific Air Lines take over. Four runs will be made every fortnight, three of them from Sydney and one from Auckland, via Fiji, Canton Island, Honolulu, and San Francisco. Incidentally, Pan American World Airways reopened their San Francisco-Auckland service on May 25th; DC-4s are being used and the service operates weekly.

### CANADA

Following P.I.C.A.O.'s lead, I.A.T.A. will establish its permanent Headquarters in Montreal, according to a statement made recently by its Director-General, Sir William P. Hildred.

* * *

Mr. A. Patten Wilson has been appointed assistant traffic manager in London for Trans-Canada Airlines. Mr. Wilson joined T.C.A. in 1941 to organize the company's New York office, and more recently served as an intelligence officer with the Allied Government Civil Affairs Division on the Continent.

### U.S.A.

Mr. Emory T. Nunneley has been appointed General Counsel of the U.S. Civil Aeronautics Board with effect from July 1, 1946, in place of Mr. George C. Neal, who has held this position for four years, but who has now resigned.

* * *

The Willow Run airfield at Detroit, which was built at a cost of well over 10,000,000 dollars and which has six runways, all of them more than a mile long, has been acquired from the U.S. Government by the University of Michigan. The University authorities are planning for the airfield to serve as a commercial airport for Detroit and also as a major aircraft research centre.

# The Navarro Naiad

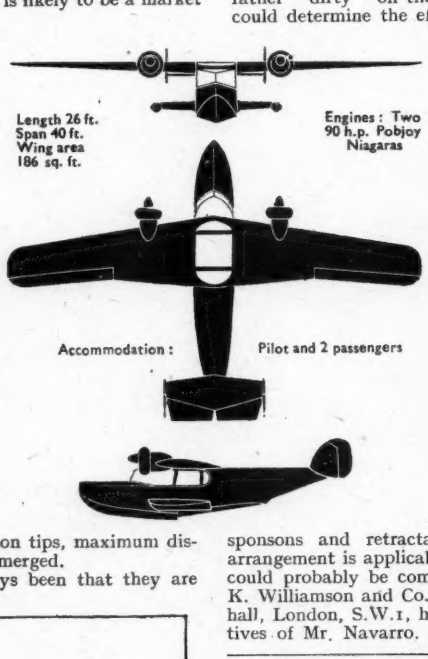
## *A Lightweight Amphibian Project : Unusual Undercarriage Arrangement*

**In addition to housing the retractable undercarriage, the sponsons of the Navarro Naiad amphibian, shown here in model form, carry small floats at their tips, a combination which is covered by a patent.**

AIRCRAFT designers have throughout the history of flying been attracted by the appeal of amphibian aircraft. The ability to operate at will from land and water should widen the usefulness to the owner, but in actual fact the type has never "caught on" in the way its characteristics would lead one to expect.

The reason is not far to seek. The extra weight of the combined alighting gear reduces the useful load by a fairly serious amount. In a small machine it may be the equivalent of one passenger; in a large it will be proportionately greater. Nevertheless, quite recently Short Brothers announced their Sealand, so obviously this very old-established firm considers that there is likely to be a market for such a type.

A different project is now announced by Mr. J. G. Navarro. It is on a more modest scale, but has some interesting features. His proposal is to fit a small flying boat with short wing stubs, or sponsons, and to house inside them a retractable wheel undercarriage. Mr. Navarro has obtained a patent (575,172) on the arrangements, a fact which may appear somewhat surprising in view of the previous use of a similar scheme in the Heston Phœnix some ten or eleven years ago. The Phœnix, however, had its wings braced by struts from the tips of the sponsons, whereas the Navarro scheme uses a cantilever wing, and it is, apparently, on this combination that the patent has been granted.

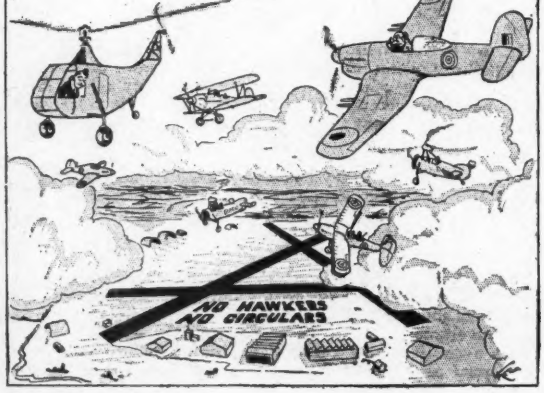



In addition to using sponsons, Mr. Navarro proposes to fit at their ends small wing-tip floats. The object is obvious. When a flying boat stabilized by sponsons heels until the tip of the sponson is submerged, there is no further increase in righting moment. By fitting floats to the sponson tips, maximum displacement occurs when the float is submerged.

One drawback of sponsons has always been that they are rather "dirty" on the water, and only model tests in a tank could determine the effect in this respect of the floats on the sponson tips. It would, however, appear that the land undercarriage should add but very little to the weight, the struts being quite short, and since such a small machine would only be used from fairly smooth water, the saving in weight might make a slight water dirtiness acceptable. A small retractable tail wheel is located just aft of the rear step of the hull.

The photograph of a model of the Navarro Naiad shows two Pobjoy Niagara engines, but it may be necessary to fit other power plants. With the power of these two small engines (180 h.p. total), the machine is designed for three people. The estimated gross weight is about 3,000 lb, but it is the experience of most designers that this figure has a tendency to grow when a machine is actually built, and it appears likely that the Naiad may run true to form in this respect.

Mr. Navarro has also designed a small single-engined landplane with sponsons and retractable undercarriage, as obviously this arrangement is applicable to many other types of aircraft. It could probably be combined with the tricycle feature. Wm. K. Williamson and Co., Ltd., of Whitehall House, 41, Whitehall, London, S.W.1, have been appointed London representatives of Mr. Navarro.




## SOUTH COAST FLYING CLUB REUNION

After seven years of inactivity the South Coast Flying Club has held a reunion dinner and dance at the Old Ship Hotel, Brighton, and opened officially last Saturday. At the dinner, the toast of the club was proposed by the Mayor of Brighton and responded to by Capt. Duncan Davis, who said that the position of the clubs was deplorable and that they were beset by all kinds of difficulties and setbacks, but that they were determined to "press on regardless." He also referred to the work that the clubs had carried on before the war and pointed out that a considerable number of club pilots had found their way into the R.A.F., N.A.A. and A.T.A.

Mr. Francis Haddock, who has been re-elected chairman of the committee, proposed the toast of the Brighton, Hove and Worthing Corporations, the Shoreham Urban District Council and the Ministry of Civil Aviation.

Mr. Anthony Harlowe, K.C., M.P., responding, said that here was the prospect of a great adventure. Mrs. Munroe replied on behalf of the Ministry of Civil Aviation and said that Brighton, Hove and Worthing were lucky in having such far-sighted councillors. There were about eighty original members and guests at the dinner.

# Fedden Engines

## *Airscrew-turbine and Flat-six to be Developed*

FOUNDED in 1945, and now installed in a factory at Stoke Orchard, Cheltenham, the firm of Roy Fedden, Ltd., is now specialising in the development of two particular types of aircraft engines which are primarily for civil use.

The first of these is a 4.6-litre flat-six sleeve-valve unit intended for medium and small sized aircraft. It will be produced in two forms, and will give respectively 165 b.h.p. for take-off and 120 h.p. for cruising in the geared version, and 135 b.h.p. for take-off and 100 b.h.p. for cruising in the ungeared version.

The engine has been specifically designed so that it will occupy the smallest space; it can be fitted inside a wing only 14in deep, and is 31in wide by 35½in long. It is unsupercharged, and in its "submerged" version can be arranged to drive either a pusher or a tractor airscrew. The net dry weight without starter-generator, reduction gear, exhaust system or cooling baffles is expected to be 285 lb, and the estimated specific fuel consumption is 0.40 lb/b.h.p./hr.

The second engine type is a 1,350 b.h.p. axial-flow airscrew-turbine, which is being designed and made to the requirements of the Ministry of Supply. In this case the dry weight is only 750 lb (0.56 lb per h.p.) and the diameter over its cowling only 27 in. Some estimated figures for the Fedden airscrew-turbine are:—

| | Static (Ground Level) | Cruising (300 m.p.h. 10,000 ft.) | Cruising (300 m.p.h. 20,000 ft.) |
|---|---|---|---|
| Airscrew R.P.M. ... | 1,475 | 1,400 | 1,400 |
| Airscrew-Shaft Horsepower ..... | 1,305 | 875 | 710 |
| Jet Equivalent Shaft Horsepower ..... | 120 | 70 | 75 |
| Total Equivalent Shaft Horsepower | 1,425 | 945 | 785 |
| Fuel Consumption-LB/HR ..... | 948 | 605 | 456 |
| Fuel Consumption Galls/HR ..... | 118 | 75 | 57 |
| Specific Fuel Consumption-LB/HR/ Total Equivalent H.P. ..... | 0.665 | 0.640 | 0.580 |

The directors of Roy Fedden, Ltd., are Sir A. H. Roy Fedden and Mr. M. J. H. Bruce. Sir Roy himself recently left by air for the United States, where he will discuss the prospects of selling British light aero engines.

### EMPLOYMENT ON THE MEDWAY

THE Board of Trade has announced that Holbourn Aero Components will take over part of Short Bros. factory at Rochester when Shorts make their expected move to Belfast. This may help to relieve the unemployment problem consequent on the move.

### ARMSTRONG-WHITWORTH FLYING WING

SPEAKING at the 10th ordinary general meeting of the Hawker Siddeley Aircraft Co., Ltd., Mr. T. O. M. Sopwith, C.B.E. (chairman), in his report said "The Armstrong-Whitworth flying wing has proved so successful that trials of the full-sized powered unit are expected by the end of the year." The A.W.G.52 all-wing glider was described in *Flight*, May 9th, 1946.

### HOLLAND'S FIRST

A DUTCH reader sends us a newspaper cutting from Amsterdam which describes and illustrates what is claimed to be the first post-war-built aircraft in the Netherlands—a mid-wing pusher with tail booms, tricycle undercarriage, and powered by a Ford V-8 engine driving a four-bladed airscrew.

In his covering letter our correspondent says it was designed in an attic during the German occupation, and in order to get materials to start building the main components "German and Allied shot-down aircraft were demolished with danger for live."

Furthermore, the *Nationaal Luchtvaart Laboratorium* actually carried out some wind-tunnel tests "under the eyes of Germans who saw nothing."

# BIRTHDAY HONOURS

## *Jet Engine Designers, Test Pilots and Air Line Operators Decorated*

### ORDER OF THE BRITISH EMPIRE

**(Civil Division.)**

**O.B.E.**

S. E. Allchurch, lately Assistant Director, M.A.P.; A. B. Barbour, M.R.C.S., L.R.C.P., A.F.R.Ae.S., lately Commander and Chief Medical Officer, A.T.A.; E. C. Baughan, Principal Scientific Officer, Operational Research Section, Coastal Command, M.A.P.; H. Baume, M.I.A.E., Works Manager, D. Napier and Sons, Ltd.; H. H. Byfield, Assistant Director of Contracts, AIR MIN.; W. W. Cocker, J.P., President, No. 1035 (Accrington) Squadron, A.T.C.; T. C. Coles, Chief Engineer, AIR MIN.; V. G. Crudge, Regional Director (West Atlantic), B.O.A.C.; E. S. Greenwood, Chief Test Pilot, Gloster Aircraft Co., for his part in the attempt on the World Speed Record; W. I. Hay, Assistant Chief Surveyor, Glasgow, British Corp. Register of Shipping and Aircraft; S. G. Hooker, D.Phil., Assistant Chief Engineer, Gas Turbines, Rolls-Royce, Ltd.; H. R. Hussey, Chief Buyer, B.O.A.C.; H. Larnder, Assistant Director of Communications Development, M.A.P.; A. C. B. Lovell, Principal Scientific Officer, Telecommunications Research Estab., M.A.P.; Ald. W. Pashby, J.P., Chairman, Hull Wing Committee, N.E. Command, A.T.C.; A. H. Reeves, lately Principal Scientific Officer, Telecommunications Research Estab., M.A.P.; Prof. D. M. Robinson, lately Senior Scientific Officer, Brit. Air Comm., Washington; F. M. Sayers, lately Controller of Signals Equipment, Brit. Air. Comm., Washington; D. N. Walker, A.M.I.Mech.E., M.I.A.E., A.F.R.Ae.S., lately Development Manager, Power Jets, Ltd.; H. W. Walsh, Principal, AIR MIN.; G. O. Waters, A.R.Ae.S., Man. Dir., Channel Islands Airways, Ltd.

Dr. S. G. Hooker, Rolls-Royce Ltd. —O.B.E.

**M.B.E.**

Miss L. Anderson, Higher Clerical Officer, AIR MIN.; Miss F. Austin, Welfare Supervisor, Rolls-Royce, Ltd.; N. Blakey, Secretary, Short Bros., Ltd., Sunderland; Miss C. Brunning, Director and Secretary, Allied Airways, Ltd., Dyce; A. S. Butler, Senior Stores and Accounts Officer, AIR MIN.; H. Campbell, Engineer Superintendent, Associated Airways Joint Committee, and Chief Engineer, Isle of Man Air Services, Ltd.; H. Catlow, Technical Officer, M.A.P.; Major F. J. Chapple, D.S.O., Member, Bristol Wing Committee, South-West Command, A.T.C.; E. J. Charman, Senior Executive Officer, AIR MIN.; A. H. Cooke, Esq., Ph.D., Demonstrator and Lecturer, Clarendon Laboratory, Oxford, for services to M.A.P.; G. T. Cutler, lately Principal Assistant Controller of Light Metals, M.A.P.; G. E. R. Eddowes, Senior Staff Officer, M.A.P.; H. Elder, lately in charge of the Air Min. Photo-Interpretation Section; J. W. Findlay, lately Senior Scientific Officer, Directorate of Communications Development, M.A.P.; J. E. Giles, Flight Radio Officer, B.O.A.C.; Mrs. M. Grant, Principal, Marchwood Medical Rehabilitation Centre for R.A.F. personnel; F. T. Hornsby, Works and Production Manager, Marshall's Flying School, Ltd.; Wing Cdr. E. Knowles, Education Officer, AIR MIN.; W. B. Mann, Chief Engineer, Southern Section, Scottish Airways, Ltd.; N. B. Manson, Chairman, Hove Training Committee, S.E. Command, A.T.C.; J. Mason, D.Phil., M.Sc., Inspector of Fuels and Lubricants, A.I.D., M.A.P.; W. McMeeking, Line Engineer, B.O.A.C.; R. V. Murray, Staff Officer, Min. of Civil Aviation; S. Oldfield, A.R.Ae.S., Superintendent, Engineering Current Development, B.O.A.C.; Miss H. A. Handley Page, Voluntary Worker in charge of Accounts and Contracts Section, R.A.F.; L. O. Painter, for services as Planning Superintendent, Metal and Produce Recovery, M.A.P.; G. L. Pickard, D.Phil., Senior Scientific Officer, M.A.P.; J. W. S. Pringle, lately Principal Scientific Officer, Telecommunications Research Establishment, M.A.P.; J. Rasmussen, Chief Liaison Officer, Vickers-Armstrongs, Ltd., Supermarine Works, Southampton; F. H. Robinson, Air Traffic Control Officer, Min. Civil Aviation; W. Shorrock, Assistant Works Manager, English Electric Co., Ltd.; Mrs. M. I. G. Smith, Member of Air Min. Welfare Staff; J. Spencer, Senior Technical Officer, M.A.P.; O. O. Taylor, lately Assistant Director, M.A.P.; H. H. Tiltman, Senior Staff Officer, M.A.P.; A. K. Tozer, Mechanical and Electrical Engineer, AIR MIN.; L. Walker, J.P., D.L., Chairman, Islington Wing Committee, London Command, A.T.C.; Capt. H. A. Watts, Principal Technical Officer, M.A.P.

### IMPERIAL SERVICE ORDER

H. J. Culpin, Principal, AIR MIN.

### BRITISH EMPIRE MEDAL

**(Civil Division.)**

W. Brace, Traffic Superintendent, No. 25 Maintenance Unit, R.A.F.; H. Brogden, Shop Foreman, Telecommunications Research Establishment, M.A.P.; J. W. Bullock, Superintendent of Stores, No. 3 Maintenance Unit, R.A.F.; W. C. H. Crook, Foreman Tool Inspector, D. Napier and Son, Ltd., Acton; T. Egan, Foreman of Stores, No. 2 Maintenance Unit, R.A.F.; A. E. Farminer, Engineer, Scottish Airways and Highland Airways; J. Fielden, Chargehand M/T Driver, No. 11 Maintenance Unit, R.A.F.; W. G. Firmin, Principal Foreman of Stores, Telecommunications Research Estab., M.A.P.; F. W. Gluning, Laboratory Assistant, Aircraft Torpedo Development Unit, M.A.P.; J. H. Groombridge, Mechanic, Rádar Research Development Estab., Min of Supply; W. J. Hayward, Torpedo Fitter, Aircraft Torpedo Development Unit, M.A.P.; T. A. Jupp, Principal Foreman of Stores, No. 214 Maintenance Unit, R.A.F.; F. Lee, Inspector of Works, R.A.F. Station, West Raynham; F. M. Bigwood-Lewis, Principal Foreman of Stores, No. 212 Maintenance Unit, R.A.F.; F. J. Loades, Chargehand Instrument Maker, Telecommunications Research Estab., M.A.P.; J. F. Martin, M.M., Warrant Officer, No. L481 (Lambeth) Squadron, A.T.C.; D. H. Moseley, Assistant Foreman, Telecommunications Research Estab., M.A.P.; S. Y. Myers, Foreman, Radar Research and Development Estab., Min. of Supply; J. Park, Shop Foreman, No. 4 Maintenance Unit, R.A.F.; C. Perring, Shop Foreman, No. 27 Maintenance Unit, R.A.F.; R. Reynolds, Principal Foreman, No. 7 Maintenance Unit, R.A.F.; E. I. Roberts, lately Clerk of Works, R.A.F. Station, St. Athan; G. A. Rowe, Milling Machinist, Saunders-Roe, Ltd.; D. T. Satchell, Assistant Foreman, Telecommunications Research Estab., M.A.P.; H. Smith, Fitter, General Electrical Co., Ltd., Birmingham; P. Southam, Principal Technical Foreman, Air Min. Outstation; F. Turner, Principal Technical Foreman, Air Min. Outstation; H. E. Whicker, Senior Foreman, B.O.A.C.; A. E. White, Chief Inspector and Engineer Shop Foreman, Associated Airways Joint Committee; J. Whittle, Chief Inspector, Air Min. Constab.; A. Woodall, Signals Officer Instructor, B.O.A.C.; F. M. Wright, Principal Foreman of Stores, No. 38 Maintenance Unit, R.A.F.

Miss C. Brunning, Allied Airways Ltd.—M.B.E.

# CORRESPONDENCE

*The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.*

## ALTITUDE COUGH CURE

### *Decompression a Cheaper Way*

I HAVE on many occasions recently seen articles in the Press regarding air-borne cures for whooping cough, and I now note that your distinguished journal has published a reference to this subject.

If, as seems reasonable, there is a certain amount of justification to believe that an air trip to a certain altitude produces the right effect to cure or alleviate this illness, surely a more economical method of achieving the same result would be to use simply constructed pressure chambers in which the effects of altitude flying could easily be synthesized. I have seen such apparatus at R.A.E., Farnborough, but, of course, such elaborate equipment would not be required for the purpose suggested above.

An apparatus on these lines could easily be installed in every town, and by simple control, any height or change of altitude could be simulated—in fact, as you suggest, another few thousand feet may have made all the difference in the experiments you quote. With pressure apparatus, patients could be taken up till they bust! R. J. SULLIVAN.

[As mentioned in the article, "Altitude Research," elsewhere in this issue, respiratory complaints have been treated in Germany by the use of the decompression chamber.—ED.]

## SPEED AND THRUST

### *Some Simple Answers to Vexed Questions*

WITH reference to your correspondent's letter [*Flight*, June 20th] on the question of jet and piston engine capabilities, perhaps the following remarks may be of help to him:—

(i) The airscrew derives its thrust by imparting backward momentum to a stream of fluid. At the same time, rotational motion is imparted, but the work done in imparting angular momentum is wasted. The question of airscrew efficiencies precludes the use of thrust as a measure of piston-engine capability, the airscrew efficiency varying widely with different conditions. The only true measure for any given set of conditions is a b.h.p. measurement obtained by dynamometer.

(ii) In the case of the jet engine we have no intermediate device for imparting backward momentum to the fluid stream (i.e., no airscrew). We cannot obtain a measurement of b.h.p. on the test bench by means of the usual types of dynamometer, but we can readily measure the static thrust.

(iii) With the jet engine there is no need for angular momentum to be imparted to the fluid stream. It should be remembered that the turbine-compressor unit is not a fundamental part of the jet engine. Compression before combustion can, for example, be obtained purely by means of ram effect.

(iv) The two *engines* are not equivalent to each other. To obtain a true comparison of capabilities under given flight conditions an imaginary airscrew efficiency must be included in the calculation of equivalent jet horse-power.

(v) For level flight at constant speed,

Thrust = Drag.

This still holds good at zero speed. In this case either we have no thrust (i.e., engines stopped) and no drag in the line of thrust, or else our thrust is countered by various reaction forces, such as those set up by chocks and brakes and by ground friction. "A. E. O."

## NOT SO SIMPLE

### *Practical Experiences of Strip Casualties in Burma*

CONGRATULATIONS to "Indicator" on his "Not so Simple" article.

Referring to the training of wartime pilots in cross-wind landings, in my own case these were practically non-existent. During E.F.T.S. days I had one single dual on "cross-winds," and solo practice was "not permitted." At S.F.T.S., my log book shows two hours' dual, and three solo on Harvard IIA's and Master IIs. From S.F.T.S. until I joined my squadron at Imphal Main, I flew 53 hours 25 min at an O.T.U. in the Middle East on Hurricanes.

During eleven months in Burma, all the strips were single clearings (with the exception of Meiktila Main), made from "paddy" fields with the bunkers knocked out. Flying from these strips entailed taking off in one direction and landing in the opposite direction. The strips were cut where the terrain made them physically possible and prevailing winds could never be considered.

The strip which stands most clearly in my mind is Imphal, where terrific cross-winds were a daily occurrence, and in the latter days of 1944 it became a graveyard of Dakotas and Commando C.46s. At one period the crashes were on an average of one a day, and in our own squadron two new pilots who joined us ended up on the opposite side of the Manipur Road amidst the undergrowth.

The aircraft which I found most unpleasant to land in heavy cross-winds on those muddy Burma strips was the Harvard IIA. After the first few attempts at "three pointers," and a nasty scare during one attempt, "wheelers" became universal.

Neither Spitfires nor Hurricanes gave us much trouble in cross-winds after a few hours' flying under those conditions, yet from Imphal to Rangoon the strips all took their quota of Dakotas.

Agreeing with "Indicator," I also believe that no future pilot can be really proficient if he is taught on anything but the "hard" lines. I can't see why people wish to eliminate one of the three controls, for on many occasions I have prayed that the cockpit contained a few more!

JOHN INGRAM,
Ex-XI Squadron, S.E.A.A.F.

## IN THE AIR

### *Suggested Continuation with Light Civil Types*

THANKS, "Indicator," for those very interesting "In the Air" series of articles dealing with the war's outstanding military aircraft.

I am sure that many readers would welcome a series on post-war light civil aircraft. C. F. PENHALIGON.

## R.A.F. TRADESMEN

### *Treatment Skilled Men Resent*

AS a sergeant fitter, with ten years' service, may I say a few words on why the R.A.F. is having difficulty in retaining its skilled men?

The difficulty of "settling down" in Service life is undoubtedly a bugbear, but it is mitigated to some extent by the airman's realization that he can be more or less content on any normal station, providing he is what he likes to call "let alone," and it is this business of not being "let alone" that is the cause of the skilled men's flight from the Service and the grievous discontent of those compelled to continue in the R.A.F.

The tradesman may be called upon to work long hours, and a great deal of unpaid overtime, perhaps, at his trade, and this he will do fairly cheerfully. But the trouble begins when work at his particular trade is slack and he finds himself at anybody's mercy.

A short list of the jobs he may find himself doing includes coal fatigues, incinerator duties, the collection of dead leaves, cleaning out and scrubbing odd buildings, polishing various floors, digging and filling in holes, moving lumber about, and quite a few other tasks. All these tasks are carried out under the supervision of non-technical N.C.O.s or "tradesmen," and the Service police—a very sore point.

These tasks faithfully performed, he is then permitted to work overtime at his trade again, with the cheerful knowledge that when the aircraft are serviced he may once again be handed over to the camp commandant or S.W.O. for further fatigues.

Add to this, guard duties, etc., ceaseless changing of billets at the whims of the powers-that-be, etc., and compare it with the civilian tradesman's lot, and you will see which is more likely to attract.

The solution is, of course, to treat the skilled tradesman in such a fashion as to dignify himself and his job in his own eyes. (The trade union looks after the civilian.) You say "a good craftsman is worth good pay;" quite right, and it should be obvious that he is also worth decent treatment.

It is clear that a little imagination and organization could enable the odd duties referred to, so demoralizing to the tradesman, to be carried out by special unskilled parties; but whether these reforms will be carried out in my lifetime I sadly doubt.

Petty irritation to the point of infuriation appears to be the motto. "SGT."

"*Flight*" photograph.

**FOR TROOP MOVEMENTS: The prototype Handley Page Hastings photographed while taking off for a demonstration flight. The large payload, high speed, and excellent handling qualities of the Hastings make it well suited to the requirements of Transport Command.**

# SERVICE AVIATION

## *Royal Air Force and Naval Air Arm News and Announcements*

### *Lincolnshire Airfields*

THE Under Secretary of State for Air has indicated that the Air Ministry has decided, so far, to retain the following ten airfields in Lincolnshire: Binbrook, Coningsby, Cranwell, Digby, Hemswell, Kirton-in-Lindsey, Manby, North Coates, Spitalgate and Swinderby. Other airfields which will eventually be given up, although they are likely to remain in use for some time for Government purposes, are: Bardney, Caistor, Cammeringham, Coleby Grange, Donna Nook, Dunholme Lodge, Elsham Wolds, Fiskerton, Goxhill, Kirmington, Wellingore, Wickenby and Woodhall Spa. Most of the remaining airfields in Lincolnshire are likely to be required for flying, but final decisions have not yet been taken.

### *Exhibitions as Recruiting Aids*

THROUGHOUT the summer the R.A.F. intends to hold exhibitions, including small parks of aircraft, in many large towns, as part of the plan to recruit 100,000 men by the end of the year.

Special sections will display the ground trades in which vacancies exist, and large-scale photographs will illustrate many Air Force activities.

The first of the exhibitions opened at Derby on June 24th; aircraft on show included the Vampire, Tempest, Typhoon, and Spitfire XIV. Also on view were a Link Trainer, guns, gun turrets, rocket projectiles, radar equipment, and a model airfield showing navigational aids.

### *Empire Air Co-operation*

ON June 21st, in Sydney, Air Chief Marshal Sir Keith Park announced that the Air Ministry's proposals for continuation of the wartime aircrew training scheme, which he is discussing with the R.A.A.F., had been generally approved by the New Zealand authorities.

The proposals suggest:— (a) That Britain should maintain and expand her R.A.F. training establishments for flying training, radar, bombing and gunnery; (2) that Dominion airmen should attend R.A.F. courses; (3) regular exchange of R.A.F. and Dominion personnel; (4) that all the Empire air forces should use the same types of aircraft, equipment and the same operational technique.

Air Marshal Sir Roderic Hill went to Southern Rhodesia on a similar mission in May, and it was announced in June that the S. Rhodesian Government had accepted the Air Ministry plan "in principle."

### *Appointments*

AIR MARSHAL SIR RODERICK CARR, K.B.E., C.B., D.F.C., A.F.C., who is Air Officer Commanding-in-Chief India, has been appointed a Deputy to the Commander-in-Chief, India.

Air Comdre. E. D. H. Davies has been appointed A.O.C. No. 65 (London Reserve) Group, R.A.F. and A.T.C.

The new A.O.C. served in the R.N.A.S. as a pilot in the 1914-18 war, and has played for the R.A.F. in rugby and tennis championships.

### *Memorial to Polish Pilots*

MARSHAL OF THE ROYAL AIR FORCE LORD PORTAL appealed recently for funds towards the erection of a memorial to 546 Polish fighter pilots, lost while flying from this country.

A committee under the presidency of Air Vice-Marshal Izycki, A.O.C.-in-C. Polish Air Force, and with Air Marshal Sir Roderic Hill as chairman, has approved a design by the Polish sculptor Lubelski, which it is proposed to erect at Northolt, the main base of the Poles during the war.

A large part of the funds required has already been received, but a balance of £2,000 must be found before the monument can be built. Donations should be addressed to Lord Portal, c/o the *Daily Telegraph*, Fleet Street, London, E.C.4.

### *Naval Air Reserve*

REAR-ADMIRAL CHARLES LAMBE, former Captain of the *Illustrious*, and now Assistant Chief of Naval Staff (Air), speaking at the first reunion dinner of No. 854 Naval Air Squadron, said that the Air Branch was likely to employ a third of all Naval personnel.

Rear-Admiral Lambe, envisaged the future development of a pilot-observer who would carry out duties formerly belonging to two crew members. One third of these would be officers.

Since all the carriers in the Navy could not be kept in commission it was proposed to organize and maintain 25 reserve squadrons.

# SERVICE AVIATION

## Awards

### Royal New Zealand Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations in the South-West Pacific area:—

**Bar to Distinguished Flying Cross**

Flt. Lt. W. B. MACKLEY, D.F.C.

**Distinguished Flying Cross**

Flt. Lt. J. A. HENDRY.
Flt. Lt. R. L. SCOTT.
Flt. Lt. D. F. T. OZEEHAN.
P/O. A. N. OLIVER.

## Roll of Honour

*Casualty Communiqué No.* 591.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 292 are second entries giving later information of casualties published in earlier lists.

### Royal Air Force

KILLED IN ACTION.—F/O. R. R. Lamb; Flt. Sgt. G. B. W. Peck; Flt. Lt. T. R. White.

MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. A. J. Baecke.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Act. Flt. Lt. F. J. Abbott; Sgt. W. Absalom; P/O. A. J. Adams, D.F.C.; F/O. K. C. Allan; F/O. K. C. Allan; W/O. S. R. Anderson, D.F.M.; Sgt. D. Anthony; Flt. Sgt. W. Ashford; Sgt. K. J. Ashmore; F/O. A. J. Backshell; P/O. W. Bainbridge; Sgt. J. C. Baker; Sgt. D. P. Bannister; Flt. Sgt. P. T. Barlow; F/O. D. S. Barr; Flt. Lt. J. Barritt, D.F.C.; Sgt. C. H. Bartlett; Flt. Sgt. D. J. Bates; Sgt. D. Bates; Flt. Sgt. D. G. Baxter; P/O. A. J. Bezant; Sgt. C. E. Billard; F/O. G. R. P. Blackbourn; W/O. I. H. Bond; P/O. C. W. Bowers; F/O. F. J. Brickman; F/O. W. G. Brooks; Sgt. J. Bucks; Flt. Sgt. D. A. Bullock; F/O. R. P. Bulman; Sgt. D. C. R. Burnell; Sgt. A. S. Burt; Sgt. F. Caffrey; Sgt. W. Canning; Flt. Sgt. J. F. Carvell; Sgt. A. G. Chapman; Flt. Sgt. J. F. Charlton; Flt. Sgt. J. Coates; Flt. Sgt. J. T. Cockburn; Act. Sqn. Ldr. K. L. Collinson, D.F.C.; Act. Flt. Lt. N. C. Cowley; Flt. Lt. A. Crabtree; Flt. Sgt. A. J. Crampin; Act. Sqn. Ldr. D. R. Crawford; F/O. J. Crawford; Flt. Sgt. H. McK. Currie; Flt. Sgt. W. A. Daniel; Sgt. F. C. Danvers; Sgt. T. E. David; Flt. Sgt. V. C. Davidson; Flt. Lt. M. De-Kerdrel; Sgt. A. T. Dixon; Sgt. A. T. Dobson; P/O. D. D. Donkin; Sgt. W. Drysdale; F/O. R. B. A. Dukelow; Sgt. A. H. Dunning; Flt. Sgt. D. W. Eastcott; Sgt. C. A. Ebbs; Sgt. W. H. Edge; Sgt. F. G. Edwards; Sgt. G. J. Edwards; F/O. E. L. Ellis; P/O. L. P. Etheridge; P/O. N. P. Etheridge; Sgt. K. J. Etherington; Act. F/O. N. J. Evans; Sgt. E. H. Fletcher; Flt. Sgt. G. Forman; F/O. E. S. Fraser; Sqn. Ldr. R. G. R. Frazer; F/O. R. T. Gawthorp; Sgt. D. J. G. Gibb; Sqn. Ldr. M. V. Gibbon, A.F.C.; Flt. Sgt. S. F. Giles; F/O. B. W. Golden; Sgt. C. I. Grant; Flt. Sgt. L. D. Griffiths; Flt. Lt. D. Grisdale; P/O. E. Grundy; W/O. H. A. Hall; Flt. Sgt. C. A. Hamill; Flt. Sgt. A. C. Harrison; Flt. Sgt. G. Harrison-Broadley; Flt. Sgt. J. R. Hartshorn; Sgt. W. Hastings; Sgt. D. Healey; Sgt. E. C. Hemmant; F/O. H. Henderson; Sgt. T. W. Heron; Flt. Sgt. A. E. Higgins; Act. Flt. Lt. E. Howell; F/O. R. E. Hughes; Flt. Sgt. K. Hunter; F/O. R. J. Ingham; Sgt. B. Jackson; Sgt. S. S. James; Sgt. W. L. James; Sgt. J. D. Jarvis; Sgt. L. J. Jeffrey; Sgt. E. S. John; F/O. J. Johnson; F/O. A. M. Jones, D.F.M.; Sgt. I. Jones; Flt. Sgt. M. Jones; Flt. Sgt. S. L. Jones; Flt. Sgt. A. J. Joyce; Sgt. H. B. King; Flt. Sgt. J. A. Leigh; F/O. D. H. P. Lott; Flt. Sgt. L. R. J. Lucas; Flt. Lt. J. C. R. McCallum; W/O. D. S. McGregor, D.F.M.; F/O. A. F. McKellar; Act. Sqn. Ldr. R. D. McLaren; F/O. W. McLeod; Sgt. F. G. Martin; Flt. Sgt. A. Matthews; Sgt. A. F. Matthews; Sgt. C. L. Milner; P/O. S. H. Moore; Flt. Sgt. G. A. C. Morgan; F/O. G. Morris; Sgt. B. H. Nicholl; W/O. A. E. Nicholls; W/O. A. J. Norman; P/O. A. A. Oak; Sgt. D. P. O'Keefe; Flt. Sgt. R. E. O'Neill; Sgt. F. C. J. O'Shea; Sgt. F. Pallister; Sgt. J. Pannett; Flt. Sgt. K. Parkin; P/O. J. M. Peace; P/O. J. E. Peach; P/O. W. G. Pearce; Flt. Lt. G. R. Phelps; Sgt. J. P. Plant; Flt. Sgt. T. W. J. Pollard; Sgt. J. H. Porter; Flt. Lt. D. Potts; Act. Flt. Sgt. A. F. Poynton; Sgt. C. E. Preston; F/O. R. E. Proudley; W/O. J. D. R. Pugsley; Sgt. A. J. Rabin; Sgt. C. E. Rashley; Sgt. A. K. Rayner; Sgt. A. Reilly; F/O. L. J. Rich; Sgt. R. Richards; Flt. Sgt. L. G. Roberts; Sgt. A. K. Robinson; Sgt. R. L. Rogers; Flt. Sgt. J. F. Rowan; Sgt. H. D. Rutt; Sgt. H. A. Sargent; Sgt. L. E. Sayer; Flt. Sgt. J. Scott; Act. Flt. Lt. P. Scott; Sgt. F. E. Self; P/O. L. W. Sellman; Sgt. J. Shearer; Act. F/O. C. R. Sifton; F/O. J. M. Sinclair, D.F.C.; W/O. E. Smith; Sgt. J. Sneddon; Sgt. D. A. P. Snoxell; Act. Sqn. Ldr. A. N. Spear, D.F.M.; Sgt. E. Spencer; Flt. Lt. D. W. T. Stealey; Flt. Sgt. D. Stewart; Flt. Sgt. J. K. Stobbs; Flt. Sgt. C. I. Stocker; Sgt. E. M. Stoves; Sgt. R. L. Swaffer; Flt. Sgt. D. Taylor; P/O. J. F. W. Taylor; Sgt. R. T. Terry; F/O. A. S. Thomson; Sgt. R. Thomson; Flt. Lt. E. R. Thornton; Flt. Lt. J. S. Tootal; P/O. R. W. Towell; Flt. Sgt. W. H. Tromp; Sgt. L. F. Tyrrell; Flt. Sgt. F. Valentine; Flt. Sgt. F. A. Wall; Flt. Sgt. W. Walter; Flt. Sgt. N. Watson. Sgt. W. J. Watson; Flt. Sgt. D. G. Weaver; W/O. J. Webster; Flt. Sgt. W. F. Webster; Flt. Sgt. S. A. Wellstead; P/O. R. W. West; Sgt. F. T. White; Flt. Sgt. K. White; W/O. F. Wilkinson; Sgt. J. A. Wilson; Sgt. R. H. Wiltshire; Sgt. H. Winning; Act. Flt. Lt. F. R. Woodger; Act. W/O. R. Wright.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. F. J. Amey; Flt. Lt. B. B. Callick; F/O. W. C. D. Slater.

KILLED ON ACTIVE SERVICE.—A/C.1 T. H. Anderson; A/C.2 D. J. Binding; L.A/C. F. H. Bovingdon; A/C.1 W. J. Elton; Flt. Lt. P. A. Fissett, D.F.C.; Flt. Lt. J. E. Gilder; L.A/C. G. W. Griffiths; F/O. E. L. Hill; F/O. S. Hodges, D.F.C.; Flt. Lt. F. W. Kenrick, D.F.C.; Flt. Lt. G. Knapp; Flt. Lt. R. A. Marks; F/O. G. F. Phillipson, D.F.M.; Flt. Lt. D. J. Rowe; Flt. Lt. L. Simpson, D.F.C.; Flt. Lt. J. T. Stevens, D.F.C.; Flt. Lt. C. R. Wilson, D.F.C.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—P/O. E. G. Gale.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. G. F. A. Clapton; Sgt. H. W. N. Drawbridge; Sgt. R. Holmes; Sgt. E. D. Keeling; Sgt. L. M. Tannen; Sgt. P. H. Voller.

DIED ON ACTIVE SERVICE.—P/O. J. E. Bowden; Flt. Sgt. J. A. Bowden; Act. Sqn. Ldr. D. S. Clinch; Cpl. J. Darwin; A/C.1 W. J. Deacon; L.A/C. R. E. Evans; A/C.1 M. R. Feltham; Cpl. E. Flaskett; L.A/C. M. Foley; A/C.2 W. French; Cpl. J. Garside; A/C.2 Handibode; W/O. A. E. Henry; A/C.2 E. W. Holding; A/C.1 F. J. Jordan; L.A/C. F. W. Kearney; A/C.1 G. R. Larter; Cpl. E. O. Mahon; Cpl. P. C. Marriott; W/O. A. Merchant; L.A/C. P. R. Millar; Cpl. A. W. Mitchell; L.A/C. F. W. A. Moore; A/C.1 J. K. Paak; L.A/C. S. Pocklington; A/C.1 D. J. Price; A/C.1 H. J. Ramsey; A/C.1 T. Rickard; L.A/C. E. J. Seddon; L.A/C. D. A. Simpson; A/C.2 G. W. Simpson; Flt. Sgt. A. G. Stammers; A/C.1 O. W. Stapeley; Cpl. A. Street; A/C.2 R. C. Thompson; Cpl. J. W. Tremayne; L.A/C. G. R. Turner; L.A/C. S. Wild; Cpl. G. Wilson.

The Indian contingent which took part in London's victory parade recently visited Berlin. They were inspected by Marshal of the Royal Air Force, Sir Sholto Douglas, who is seen talking to Subedar Gage Chale, a Ghurka V.C.

**Badge of No. 345 (French) Squadron, Royal Air Force—"Nil Actum Credo Si Quid Supersit Agendum" (Nothing I Deem Achieved with Aught still unachieved).**

### Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Act. F/O. L. F. B. Barrett; Act. F/O. B. E. Barrow; W/O. J. E. Bateup; F/O. J. L. Beeson; Flt. Sgt. F. Bennett; Act. Flt. Lt. G. O. Cameron; F/O. P. G. Cameron; Act. Flt. Lt. R. M. Clarke; W/O. J. B. Cossart; Flt. Sgt. A. C. Davidson; Act. F/O. N. K. Dunlop; Flt. Sgt. O. B. Elliott; F/O. D. A. Ellis; Flt. Sgt. C. Fallon; Flt. Sgt. R. Y. French; Flt. Lt. R. K. Gibson, D.F.C.; Flt. Sgt. J. N. Griffin; Act. F/O. D. B. Hamilton; F/O. G. H. Hammond; Flt. Sgt. W. W. Harris; P/O. G. K. Hendy; Flt. Sgt. G. A. Henry; W/O. J. W. M. Herbert; F/O. F. J. Howells; Act. F/O. W. C. James; Act. F/O. E. T. Jetson; Flt. Sgt. K. A. Kee; Act. F/O. R. H. Kench; Flt. Sgt. H. E. Lambourne; P/O. K. O. Langham; Flt. Sgt. R. H. Lock; Flt. Sgt. R. K. Locke; Flt. Sgt. J. J. L. McDonell; Flt. Sgt. M. Marshall; F/O. H. O. Mason; Flt. Sgt. R. L. Masters; Act. F/O. M. A. Mathieson; F/O. P. H. Morris; P/O. A. D. Morrison, D.F.C.; P/O. D. R. Patterson, D.F.C.; P/O. C. T. Pollard; W/O. S. E. Richards; P/O. K. A. Robinson; W/O. E. Smith; Flt. Sgt. L. S. Tuckey; F/O. J. L. Walters; F/O. K. Weber.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—Sgt. R. R. Oelrich.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. C. T. G. Coward.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. W. Mitchell; Flt. Sgt. I. A. West.

### Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. H. R. Hebert; F/O. H. K. Lyle; Sgt. W. Osadchy; Act. W/O. W. G. Pavely; Flt. Sgt. R. G. Pickering; Flt. Sgt. J. L. R. Remillard; Flt. Sgt. J. K. Scott; P/O. J. T. Short; F/O. J. R. Thomas; P/O. P. Uzelman; F/O. D. E. Walker; F/O. B. Yellin; F/O. J. Zywina.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. V. Sobeski.

### Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. C. B. Andrews; P/O. B. L. Butler; W/O. F. H. Dix; Flt. Sgt. K. Drummond; Flt. Sgt. B. W. Ellison; Flt. Sgt. H. R. Falloon; Sgt. C. J. F. Jarvis; Act. F/O. R. B. Knight; Flt. Lt. D. L. Knobloch; Flt. Sgt M. B. Laing; Flt. Sgt. A. G. Partridge; F/O. T. A. Robson, D.F.C.; Flt. Sgt. B. J. Schollum.

### South African Air Force

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Maj. R. L. Morrison, D.F.C.